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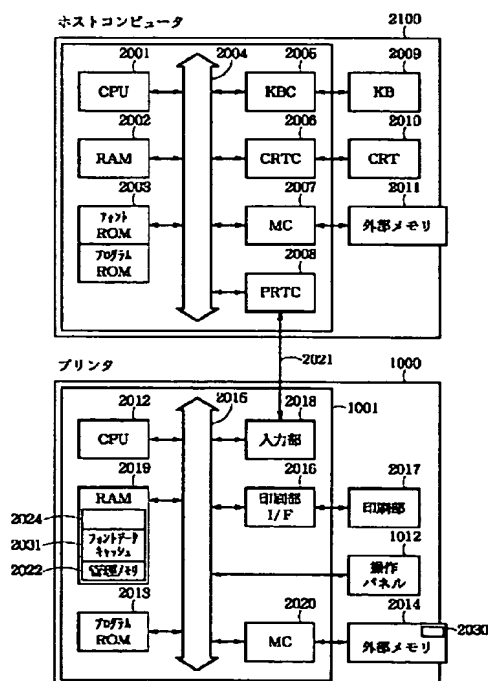
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(54) 【発明の名称】 印刷制御装置および印刷制御装置のデータ処理方法およびコンピュータが読み出し可能なプログラムを格納した記憶媒体

(57) 【要約】

【課題】 文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減して高速に印刷イメージを描画処理することである。

【解決手段】 文字種毎の文字データ群を外部メモリ2014にあらかじめ記憶させ、印刷要求時に解析された文字データを文字種毎に管理する文字情報管理テーブルを管理メモリ2022上に作成し、該テーブルを参照して記憶された1つの文字種毎の文字データ群をフォントデータキャッシュメモリ2031に読み込み、該読み込まれた文字データ群を参照して最終的な印刷イメージとなる文字データをCPU2012がRAM2019上に描画処理する構成を特徴とする。



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## 【特許請求の範囲】

【請求項1】 所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置であって、  
文字種毎に印刷可能な文字データ群を記憶する第1の記憶手段と、

前記第1の記憶手段から文字種毎に読み出されるいずれか1つの文字データ群を記憶する第2の記憶手段と、

前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成手段と、

前記作成手段により作成された各文字情報管理テーブルに基づいて前記第1の記憶手段に記憶されるいずれか1つの文字データ群を前記第2の記憶手段に対して順次読み込む制御手段とを有し、

前記制御手段は、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理することを特徴とする印刷制御装置。

【請求項2】 前記第2の記憶手段に対するアクセス速度は、前記第1の記憶手段に対するアクセス速度よりも高速とすることを特徴とする請求項1記載の印刷制御装置。

【請求項3】 前記第1の記憶手段は、不揮発性メモリ媒体で構成することを特徴とする請求項1または2記載の印刷制御装置。

【請求項4】 前記第2の記憶手段は、揮発性メモリ媒体で構成することを特徴とする請求項1または2記載の印刷制御装置。

【請求項5】 所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置のデータ処理方法であって、  
前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成工程と、  
前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段に記憶される各文字データ群を第2の記憶手段に順次読み込む読み込み工程と、  
前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程と、を有することを特徴とする印刷制御装置のデータ処理方法。

【請求項6】 所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を行う印刷装置を制御するコンピュータが読み出し可能なプログラムを格納した記憶媒体であって、  
前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成工程と、  
前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段に記憶される各文字データ群

を第2の記憶手段に順次読み込む読み込み工程と、  
前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程と、を有することを特徴とするコンピュータが読み出し可能なプログラムを格納した記憶媒体。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置および印刷制御装置のデータ処理方法およびコンピュータが読み出し可能なプログラムを格納した記憶媒体に関するものである。

## 【0002】

【従来の技術】この種の印刷システムでは、複数の異なる書体や文字サイズなど膨大な文字データを格納するために磁気ディスク等の大容量外部メモリを用いていたが、磁気ディスク等の不揮発性メモリへのアクセス速度は一般的に遅く、印刷の際には文字データを1文字単位で不揮発性メモリより読み出す必要があるために、不揮発性メモリへのアクセス回数が増加し高速印刷が困難であった。

【0003】そこで、不揮発性メモリへのアクセス回数を減らすために、文字データを適当な文字種、例えば書体、文字サイズ等のグループ単位で不揮発性メモリからRAM等のアクセスが高速な揮発性メモリへとコピーし、各文字データの参照を揮発性メモリから行なうことにより、不揮発性メモリへのアクセス回数を減らし高速印刷を図っていた。

## 【0004】

【発明が解決しようとする課題】しかしながら、上記方法では文字種（書体、文字サイズ等）分の文字データを揮発性メモリへ格納するだけのメモリ容量が必要であるために製品コストが上がるという欠点があり、さらに、揮発性メモリの容量では1書体や1文字サイズ分の文字データを格納するのが限界であり、複数の書体や文字サイズを使用しての印刷を行なう場合には、文字種が切り替わる度に、不揮発性メモリから揮発性メモリへ文字データを読み込む必要があり、この読み込み処理の増加によりタイムロスが発生し印刷処理速度が低下するという問題点もあった。

【0005】本発明は、上記の問題点を解消するためになされたもので、本発明の目的は、文字種毎の文字データ群をアクセス速度が低速な記憶媒体にあらかじめ記憶させておき、印刷要求時に解析された文字データを文字種毎に管理する文字情報管理テーブルを作成し、該テーブルを参照して記憶された1つの文字種毎の文字データ群をアクセス速度が高速な記憶媒体に読み込み、該高速な記憶媒体に読み込まれた文字データ群を参照して最終的な印刷イメージとなる文字データを描画処理すること

により、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮して高速に印刷イメージを描画処理することができる印刷制御装置および印刷制御装置のデータ処理方法およびコンピュータが読み出し可能なプログラムを格納した記憶媒体を提供することである。

#### 【0006】

【課題を解決するための手段】本発明に係る第1の発明は、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置であって、文字種毎に印刷可能な文字データ群を記憶する第1の記憶手段と、前記第1の記憶手段から文字種毎に読み出されるいずれか1つの文字データ群を記憶する第2の記憶手段と、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成手段と、前記作成手段により作成された各文字情報管理テーブルに基づいて前記第1の記憶手段に記憶されるいずれか1つの文字データ群を前記第2の記憶手段に対して順次読み込む制御手段とを有し、前記制御手段は、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理するものである。

【0007】本発明に係る第2の発明は、前記第2の記憶手段に対するアクセス速度は、前記第1の記憶手段に対するアクセス速度よりも高速とするものである。

【0008】本発明に係る第3の発明は、前記第1の記憶手段は、不揮発性メモリ媒体で構成するものである。

【0009】本発明に係る第4の発明は、前記第2の記憶手段は、揮発性メモリ媒体で構成するものである。

【0010】本発明に係る第5の発明は、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置のデータ処理方法であって、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成工程と、前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段に記憶される各文字データ群を第2の記憶手段に順次読み込む読み込み工程と、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程とを有するものである。

【0011】本発明に係る第6の発明は、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を行う印刷装置を制御するコンピュータが読み出し可能なプログラムを格納した記憶媒体であって、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テ

ーブルを文字種毎に作成する作成工程と、前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段に記憶される各文字データ群を第2の記憶手段に順次読み込む読み込み工程と、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程とを有することをコンピュータが読み出し可能なプログラムを記憶媒体に格納したものである。

#### 【0012】

【発明の実施の形態】本実施形態の構成を説明する前に、本実施形態を適用するに好適なレーザビームプリンタおよびインクジェットプリンタの構成について図1～図3を参照しながら説明する。なお、本実施形態を適用するプリンタは、レーザビームプリンタおよびインクジェットプリンタに限られるものではなく、他のプリント方式のプリンタでも良いことは言うまでもない。

【0013】図1は、本発明を適用可能な出力装置の構成を示す断面図であり、例えばレーザビームプリンタ(LBP)の場合を示す。

【0014】図において、1000はLBP本体であり、外部に接続されているホストコンピュータから供給される印刷情報(文字コード等)やフォーム情報あるいはマイクロ命令等を入力して記憶するとともに、それらの情報に従って対応する文字パターンやフォームパターン等を作成し、記録媒体である記録紙等に像を形成する。1012は走査のためのスイッチおよびLED表示器等が配されている操作パネル、1001はプリンタ制御ユニットで、LBP本体1000全体の制御およびホストコンピュータから供給される文字情報等を解析する。このプリンタ制御ユニット1001は、主に文字情報を対応する文字パターンのビデオ信号に変換してレーザドライバ1002に出力する。

【0015】レーザドライバ1002は半導体レーザ1003を駆動するための回路であり、入力されたビデオ信号に応じて半導体レーザ1003から発射されるレーザ光1004をオン・オフ切り換える。レーザ光1004は回転多面鏡1005で左右方向に振られて静電ドラム1006上を走査露光する。これにより、静電ドラム1006上には文字パターンの静電潜像が形成されることになる。この潜像は、静電ドラム1006周囲に配置された現像ユニット1007により現像された後、記録紙に転写される。

【0016】この記録紙にはカットシートを用い、カットシート記録紙はLBP本体1000に装着した用紙カセット1008に収納され、給紙ローラ1009および搬送ローラ1010と搬送ローラ1011とにより、装置内に取り込まれて、静電ドラム1006に供給される。また、LBP本体1000には、図示しないカードスロットを少なくとも1個以上備え、内蔵フォントに加えてオプションフォントカード、言語系の異なる制御カード

(エミュレーションカード)を接続できるように構成されている。

【0017】〔第1実施形態〕図2は、本発明の第1実施形態を示す印刷制御装置を適用可能な印刷システムの構成を説明するブロック図である。ここでは、レーザービームプリンタ(図1)を例にして説明する。なお、本発明の機能が実行されるのであれば、単体の機器であっても、複数の機器からなるシステムであっても、LAN等のネットワークを介して処理が行われるシステムであっても本発明を適用できることは言うまでもない。

【0018】また、本発明はシステム或は装置にプログラムを供給することによって実施される場合にも適用できることは言うまでもない。この場合、本発明に係るプログラムを格納した記憶媒体が、本発明を構成することになる。そして、該記憶媒体からそのプログラムをシステム或は装置が読み出すことによって、そのシステム或は装置が、予め定められた手順で動作する。

【0019】図2において、2100はホストコンピュータで、ROM2003のプログラム用ROMに記憶された文書処理プログラム等に基づいて図形、イメージ、文字、表(表計算等を含む)等が混在した文書処理を実行するCPU2001を備え、システムバス2004に接続される各デバイスをCPU2001が総括的に制御する。また、このROM2003のプログラム用ROMにはCPU2001の制御プログラム等を記憶し、ROM2003のフォント用ROMには上記文書処理の際に使用するフォントデータ等を記憶する。

【0020】2002はRAMで、CPU2001の主メモリ、ワークエリア等として機能する。2005はキーボードコントローラ(KBC)で、キーボード2009や不図示のポインティングデバイスからのキー入力を制御する。2006はCRTコントローラ(CRTC)で、CRTディスプレイ(CRT)2010の表示を制御する。

【0021】2007はメモリコントローラ(MC)で、ブートプログラム、種々のアプリケーション、フォントデータ、ユーザファイル、編集ファイル等を記憶するハードディスク(HD)、フロッピーディスク(FD)等の外部メモリ2011とのアクセスを制御する。

【0022】2008はプリンタコントローラ(PRTC)で、所定の双方向性インタフェース(インタフェース)2021を介してプリンタ1000に接続されて、プリンタ1000との通信制御処理を実行する。なお、CPU2001は、例えばRAM2002上に設定された表示情報RAMへのアウトラインフォントの展開(ラスターライズ)処理を実行し、CRT2010上でのWYSIWYGを可能としている。また、CPU2001は、CRT2010上の不図示のマウスカーソル等で指示されたコマンドに基づいて登録された種々のウィンドウを開き、種々のデータ処理を実行する。

【0023】プリンタ1000において、2012はプリンタCPUで、ROM2013のプログラム用ROMに記憶された制御プログラム等或いは外部メモリ2014に記憶された制御プログラム等に基づいてシステムバス2015に接続される各種のデバイスとのアクセスを総括的に制御し、印刷部インタフェース(印刷インタフェース1/F)2016を介して接続される印刷部(プリンタエンジン)2017に出力情報としての画像信号を出力する。

【0024】また、このROM2013のプログラム用ROMには、図3、図6、図7のフローチャートで示されるようなCPU2012の制御プログラム等を記憶する。

【0025】CPU2012は入力部2018を介してホストコンピュータ2100との通信処理が可能となっており、プリンタ1000内の情報等をホストコンピュータ2100に通知可能に構成されている。

【0026】2019はRAMで、CPU2012の主メモリ、ワークエリア等として機能し、図示しない増設ポートに接続されるオプションRAMによりメモリ容量を拡張することができるように構成されている。なお、RAM2019は、出力情報展開領域(フレームバッファ2024)、環境データ格納領域、ホストコンピュータ2100から受信した印刷データ(プリンタ制御コード(ページ記述言語))を格納するための受信バッファとして、あるいは後述の不揮発性の外部メモリ2014から読み込んだフォントデータ2030を一時的に格納しておくためのフォントデータキャッシュメモリ2031等の作業メモリとして用いられる。

【0027】また、RAM2019の一部は印刷する文字の文字種や文字コード等の印刷情報を文字種単位に分けて管理する為の管理メモリ2022としても割り当てられる。

【0028】外部メモリ2014は、アウトラインフォントやビットマップフォント等のフォントデータ2030を記憶する為の外部メモリであり、ハードディスク(HD)等のアクセスが低速な不揮発性メモリにて構成され、メモリコントローラ(MC)2020によりアクセスを制御される。

【0029】また、外部メモリ2014は1個に限らず、少なくとも1個以上備え、上述のフォントデータに加えてオプションフォントデータ、言語系の異なるプリンタ制御コードを解釈するプログラムを格納するように構成されていても良い。

【0030】1012は前述した操作パネルで、操作のためのスイッチおよびLED表示器等が配されている。さらに、図示しないNVRAMを有し、操作パネル1012からのプリンタモード設定情報を記憶するようにしても良い。

【0031】なお、本実施形態では印刷制御装置をホス

トコンピュータ2100から転送されたプリンタ制御コードを受信して印刷出力を行なう印刷装置(プリンタ1000)に適應した例を説明する。

【0032】以下、本実施形態の特徵的構成について図2等を参照して説明する。

【0033】上記のように構成された所定の通信媒体(ネットワーク、インタフェース)を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置(プリンタ制御ユニット1001)であって、文字種毎に印刷可能な文字データ群を記憶する第1の記憶手段(外部メモリ2014)と、前記第1の記憶手段から文字種毎に読み出されるいずれか1つの文字データ群を記憶する第2の記憶手段(RAM2019のフォントデータキャッシュメモリ2031)と、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成手段(CPU2012がROM2031、外部メモリ2014等に記憶された制御プログラムを実行して管理メモリ2022上に図10に示すように作成する)と、前記作成手段により作成された各文字情報管理テーブルに基づいて前記第1の記憶手段に記憶されるいずれか1つの文字データ群を前記第2の記憶手段に対して順次読み込む制御手段(CPU2012がROM2031、外部メモリ2014等に記憶された制御プログラムを実行して読み込み処理する)とを有し、前記制御手段は、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理するので、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮することができる。

【0034】また、前記第2の記憶手段(RAM2019)に対するアクセス速度は、前記第1の記憶手段(外部メモリ2014)に対するアクセス速度よりも高速とするので、最終的な印刷データを描画する処理時間を大幅に短縮して全体としてページ単位の印刷処理を高速化することができる。

【0035】さらに、前記第1の記憶手段(外部メモリ2030)は、不揮発性メモリ媒体で構成するので、文字種毎の文字データ群を再現性よく読み出すことができる。

【0036】また、前記第2の記憶手段(RAM2019)は、揮発性メモリ媒体で構成するので、読み出した文字種毎の文字データ群から最終的な印刷イメージを生成するのに要するメモリアccessを高速化することができる。

【0037】図3は、本発明に係る印刷制御装置における第1のデータ処理手順の一例を示すフローチャートであり、図2に示したプリンタ1000の処理手順に対応

する。なお、本実施形態ではホストコンピュータ2100からプリンタ制御コードを受信すると、CPU2012に割り込みがかり、プリンタ制御コードをRAM2019上の受信バッファへと格納する。つまり、図3の処理と並行に受信処理が行なわれる。但し、この処理自身に特徴があるわけではないのでその説明は省略する。なお、(1)～(9)は各ステップを示す。

【0038】まず、ステップ(1)で、プリンタ1000はホストコンピュータ2100よりプリンタ制御コードが入力されると、データ入力待ち状態を抜けて、ステップ(2)で、プリンタ制御コード入力処理を行なう。

【0039】次に、ステップ(3)で、入力されたプリンタ制御コードを解析し、各コマンドに従った処理を行なうが、ステップ(4)で、該コマンドとして排紙コマンドを解析した場合は、ステップ(5)にて文字描画処理(詳細については後述)を行なった後、ステップ(7)で、フレームバッファ2042の内容をビデオ信号に変換し、ステップ(8)で、出力情報としての画像信号を印刷部(プリンタエンジン)2017に転送し印刷を行ない、ステップ(9)で、用紙を排紙して、ステップ(1)へ戻る。

【0040】一方、ステップ(4)で、排紙コマンド以外、すなわちその他のコマンドを解析したと判定した場合、ステップ(6)で、各コマンドに従った描画処理を行ない、フレームバッファ2044上に印刷イメージを形成した後、ステップ(1)へ戻る。

【0041】ここで、図2に示したプリンタ1000内部の管理メモリ2022上に格納される文字情報管理テーブル6000の構成を図4を用いて説明を行なう。

【0042】図4は、図2に示した管理メモリ2022上に構築される文字情報管理テーブルの構成を説明する図である。

【0043】図において、6000は文字情報管理テーブルで、図3に示したステップ(6)にて入力されたプリンタ制御コードが印刷コマンドであった場合に同コマンドにて示唆された文字情報を管理するためのものであり、後述の図6のフローチャートに添って制御されるものである。

【0044】文字情報管理テーブル6000は、文字種情報6001、1文字情報6006から構成される。さらに、文字種情報6001は、文字種を区別するために以下のような複数のパラメータから構成される。

【0045】6002は種類で、アウトラインフォントやビットマップフォント等のフォントの種類を判別するための情報が設定される。6003は書体名で、例えば明朝体、ゴシック体、ダッチ、クーリエ等の書体名を判別するための情報が設定される。6004は文字サイズで、例えば8ポイント、10ポイント、12ポイント等の文字サイズを判別するための情報が設定される。6005はグループで、文字の種類に応じて分割管理するた

めの情報が設定される。

【0046】グループ6005の例としては、JISX0208準拠の文字コードを非漢字(0x2121~0x2F7E)、第一水準漢字(0x3021~0x4F7E)、第二水準漢字(0x5021~0x7E7E)3つに分割したものや、あるいはJISX0201準拠の文字コードをローマ字(0x00~0x7F)、カタカナ(0x80~0xFF)の2つに分割したもの等を示す。

【0047】また、グループ分けに関しては上述のような設定以外にも、JISX0208準拠の全文字コードを任意の数にて分割したものでも良いものとする。なお、文字種を区別するための情報であれば上で述べた以外の情報も使用できるものとする。

【0048】さらに、1文字情報6006は、文字種情報6001に属した1文字毎のパラメータとなる文字の印刷位置としてXY座標を定義した座標情報6007、文字コード6008から構成される。なお、文字情報管理テーブル6000が1つに対し、任意の数の1文字情報を設定できるものとする。

【0049】また、文字情報管理テーブル6000は1文字種に付き1つであるが、管理メモリ2022上にメモリサイズの許す範囲内で複数個の文字情報管理テーブルを所有することを可能とする。

【0050】このように文字情報管理テーブル6000を複数個所有することにより、プリンタ制御コード中に分散して印刷指定された各文字情報をそれぞれ同一の文字属性を持った文字情報管理テーブル6000上に振り分けることが可能となる。

【0051】なお、文字情報は文字種情報6001を定義するための文字種、1文字情報6006を構成するための印刷座標や文字コードから構成されているものとする。また、文字情報はプリンタ制御コードとしてホスト2100より入力されることにより、文字情報管理テーブル(以下単にテーブルと呼ぶ)6000が生成されるが、その生成処理を後述の図6、図7を参照して説明する。

【0052】図5は、図4に示した文字情報管理テーブル6000を複数個管理する例を説明する図である。

【0053】本例では、図5に示されているように文字種情報6001の種類6002に4バイト、書体名6003に20バイト、文字サイズ6004に4バイト、グループ6005に12バイト、合計40バイトを割り当て、1文字情報6006の座標情報6007に8バイト、文字コード6008に2バイト、合計10バイトを割り当て、1文字情報の格納領域を100文字分所有している。

【0054】また、同例では1テーブル当たり1040バイトの管理メモリ2022を消費する。さらに、上述のテーブルを3セット(テーブルTAB1~テーブルT

AB3)用意することにより、同一文字種の1文字情報6006を100文字分、異なる文字種を3セット分管理可能であり、管理メモリ2022を1040バイト×3セット=3120バイト消費する。

【0055】なお、本例では1文字種当たり100文字のテーブルを3セットとしたが、管理メモリ2022のメモリサイズの許す範囲内でその数を自由に設定することを可能とする。

【0056】図6は、本発明に係る印刷制御装置における第2のデータ処理手順の一例を示すフローチャートであり、図3に示したステップ(6)に示した描画処理におけるテーブル管理制御手順に対応する。なお、(1)~(12)は各ステップを示す。

【0057】まず、ステップ(1)で、ホストコンピュータ2100から入力されたプリンタ制御コードが文字情報であるか否かを判断し、印刷情報以外であると判断した場合には、ステップ(12)で、各コマンドに添ったその他の描画処理を行って印刷処理を行なうが、本実施形態では同処理に特徴があるわけではないので具体的な説明は省くものとする。

【0058】一方、ステップ(1)で、印刷情報であると判断した場合には、ステップ(2)で、文字情報をテーブル上に登録するために、管理メモリ2022中のテーブルの検索を行なう。そして、該検索結果に基づいてステップ(3)で、上記文字情報の文字種に相当するテーブルが存在するかどうかを判断し、テーブルが存在しないと判断した場合には、ステップ(4)で、新規にテーブルを生成する必要があるため未使用のテーブルの検索を行なう。

【0059】そして、ステップ(5)で、未使用のテーブルが存在するかどうかを判定して、未使用のテーブルが存在すると判断した場合には、ステップ(6)で、文字情報中の文字種より文字種情報6001を生成し、さらに、印刷座標、文字コードより1文字情報6006を1つ格納する。

【0060】なお、全テーブルはプリンタ制御コードの入力開始時に初期化するものとする。

【0061】一方、ステップ(5)で、未使用のテーブル6000が存在しないと判断した場合には、ステップ(8)で、使用済みテーブルを解放し未使用テーブルの確保を行なう。ここで、使用済みテーブルの解放とは、テーブル中に格納されている全1文字情報6006に基づいて印刷処理を行ない、1文字情報を空にすることを意味する。また、テーブル中の1文字情報は印刷予定のものであり、同情報に基づいてフレームバッファ2024上に描画を行なうことにより実際の印刷処理が終了するのである(以降、同処理を解放処理と呼ぶ)。

【0062】具体的には、ステップ(8)において、解放を行なうテーブルの検索を行ない、検索結果より解放するテーブルの選択を行なう。テーブルは複数個存在し

この中から1つのテーブルを選択するわけであるが、テーブルの選考基準としては、以下のような方法をとる。まず、全テーブルを検索し1文字情報6006を最も多く格納しているテーブルを1つ選択する。

【0063】ここで、1文字情報の格納数が同等のテーブルが複数存在する場合には任意のテーブルを1つ選択する。同選考基準に基づいてテーブルを選択することにより、1文字情報6006の格納領域を全て消費したために1文字情報を追加格納できなくなる状態（以降、同状態をテーブルオーバフローと呼ぶ）が最も発生しやすいテーブルを優先的に解放することが可能となる。

【0064】次に、ステップ（8）で、ステップ（7）で解放するテーブルが選択された後、ステップ（9）で、同テーブルの文字種に相当するフォントデータ2030を外部メモリ2014からフォントデータキャッシュ2031上へ読み込む。

【0065】ここで、フォントデータ2030は、テーブルに格納されている1文字情報に関係なく、該当する文字種のデータ全てを読み込むものとする。しかるに、フォントデータキャッシュ2031は必要なフォントデータ2030を全て読み込めるだけの領域を確保することを前提とする。

【0066】この後、ステップ（10）で、テーブルに格納されている全1文字情報に基づいてフレームバッファ2024上に描画を行ない、全印刷が終了したと判定されるまで、ステップ（11）で印刷処理を実行して、ステップ（10）へ戻る。

【0067】一方、ステップ（10）で、印刷終了と判定された場合には、ステップ（6）で、解放されたテーブル中に新たな文字情報の格納を行ない、処理を終了する。

【0068】ここで、ステップ（10）における印刷処理ではフォントデータキャッシュ2031に格納されたフォントデータ2030を用いてビットマップフォントやアウトラインフォント等のフォントデータ2030の印刷を行なうことにより、不揮発性メモリへの過度なアクセスによるタイムロスを防ぐことが可能となる。

【0069】なお、本実施形態では、フォントデータ2030を用いての印刷処理自身に特徴があるわけではないのでその説明は省略する。

【0070】一方、ステップ（3）で、文字情報の文字種に相当するテーブルが存在すると判断した場合には、ステップ（7）で、テーブルオーバフローが発生するかどうかを判断し、テーブルオーバフローが発生しない場合には、ステップ（6）へ進み、印刷情報の格納を行ない、処理を終了する。

【0071】一方、ステップ（7）で、テーブルオーバフローが発生すると判断した場合には、ステップ（9）～（11）で同テーブルの解放処理を行なった後、ステップ（6）で、同テーブルに対し印刷情報の格納を行な

い、処理を終了する。

【0072】次に、図7に示すフローチャートを参照して、図3に示したステップ（5）における文字印刷処理手順について詳述する。

【0073】図7は、本発明に係る印刷制御装置における第3のデータ処理手順の一例を示すフローチャートであり、排紙前に同ページで生成された全テーブルの解放を行なうための処理手順に対応し、該処理に従ってテーブル中の全文字を解放することにより、同ページで印刷予定の全文字をフレームバッファ2024上に印刷イメージとして形成する。なお、（1）～（5）は各ステップを示す。

【0074】まず、ステップ（1）にて全テーブルの検索を行ない、ステップ（2）で、未解放のテーブルがあるかどうかを判断し、全テーブルを解放済みであると判断した場合には、処理を終了する。

【0075】一方、ステップ（2）で未解放のテーブルが存在すると判定した場合は、ステップ（3）で、同テーブルの文字種に相当するフォントデータ2030を外部メモリ2014からフォントデータキャッシュ2031上へ読み込む。

【0076】ここで、フォントデータ2030は、テーブルに格納されている1文字情報に関係なく、該当する文字種の文字データ全てを読み込むものとする。しかるに、フォントデータキャッシュ2031は必要なフォントデータ2030を全て読み込めるだけの領域を確保することを前提とする。

【0077】この後、ステップ（4）で、テーブルに格納されている全1文字情報に基づいてフレームバッファ2024上に描画を行ない、全描画処理が終了、すなわち印刷処理が終了したと判定されるまで、ステップ（5）で印刷処理を実行して、ステップ（4）へ戻る。

【0078】一方、ステップ（4）で、印刷終了と判定された場合には、ステップ（1）へ戻る。

【0079】ここで、図6に示したフローチャートに従って作成されるテーブルの具体的な例を図8～図10を用いて説明する。

【0080】図8は、図2に示した印刷部2017で印刷される文字印刷処理例を示す図であり、記録紙に対する印刷イメージに対応し、記録紙の上方に、入力された文字情報としての、例えば「文字コード表JIS1水」を印刷した場合である。

【0081】図8において、横方向、縦方向の矢印は上記文字列の印刷位置を定義するための座標軸であり、記録紙に対し横方向をX軸、縦方向をY軸としている。

【0082】なお、本例では同軸の座標単位を1/100インチと定義した場合について説明を行なう。

【0083】図9は、図8に示した文字印刷処理例における文字列の詳細構成を説明する図であり、「文字コード表JIS1水」を拡大表示し、1文字毎の幅高を枠で

囲んだものであり、各枠の左下端が各文字の印刷基準点を示す。

【0084】図9において、同文字列において、“文字コード表”と“1水”はアウトラインフォントの明朝体10ポイントを使用しており、“JIS”はアウトラインフォントのクレーエ書体の10ポイントを使用しているものとする。

【0085】図10は、図8に示した文字列に対して作成されるテーブル例を示す図であり、テーブルTAB1の文字種はアウトラインフォントの明朝体10ポイントのJISX0208準拠の第一水準漢字、テーブルTAB2の文字種はアウトラインフォントの明朝体10ポイントのJISX0208準拠の第一水準非漢字、テーブルTAB3の文字種はアウトラインフォントのクレーエ書体の10ポイントのJISX0201準拠のローマ字を割り当てており、各テーブルに対し1文字情報を100文字分確保している。

【0086】なお、図8の文字列のうち、“文”、“字”、“表”、“水”はテーブルTAB1に、“コ”、“一”、“ド”、“1”はテーブルTAB2に、“J”、“I”、“S”はテーブルTAB3に割り当てられている。

【0087】また、図10に示す1文字情報6006中の座標情報6007には印刷座標単位を1/100インチとした場合の印刷座標“(X座標、Y座標)”を表している。

【0088】以上のように図10に示した3つのテーブルTAB1～TAB3に基づいて印刷処理を行なうことにより、外部メモリ2014へのアクセス回数を3回に制御することが可能となる。

【0089】なお、図2に示したフォントデータキャッシュメモリ2031上に1書体分のフォントデータ2030を読み込むことができる容量を確保できる場合には、図10に示したように非漢字と漢字にグループ分けして個別に読み込む必要がなくなり、外部メモリ2014へのアクセス回数をさらに減らすことが可能であるが、1書体分のフォントデータを読み込むだけの膨大なメモリを用意する必要があるためメモリ効率が悪くなるという欠点がある。

【0090】一方、1文字毎にフォントデータ2030を読み込めば、フォントデータキャッシュメモリ2031が少量で済むという利点はあるものの、外部メモリ2014へのアクセス回数が増加するという欠点がある。

【0091】本実施形態に従って印刷処理を制御することにより、メモリ容量的に制限されたフォントデータキャッシュメモリ2031を使用しながらも、外部メモリ2014からのフォントデータ2030の読み込み回数を削減でき、高速な印刷処理が可能となる。

【0092】以下、本実施形態の特徴的構成について図6、図7等を参照して説明する。

【0093】上記のように構成された所定の通信媒体を介して情報処理装置(ホストコンピュータ2100)より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置(プリンタ制御ユニット1001)のデータ処理方法であって、あるいは所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を行う印刷装置を制御するコンピュータが読み出し可能なプログラムを格納した記憶媒体であって、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成工程(図6のステップ(1)～(9))と、前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段(外部メモリ2030)に記憶される各文字データ群を第2の記憶手段に順次読み込む読み込み工程(図7のステップ(1)～(3))と、前記第2の記憶手段(RAM2019上のフォントデータキャッシュメモリ2031)に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程(図7のステップ(4)、(5))とを有するので、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮することができる。

【0094】〔第2実施形態〕前記第1実施形態では、各テーブル中の1文字情報6006の格納数を同数にした場合について説明したが、第2実施形態では各テーブル毎に1文字情報の格納数を変えることにより、管理メモリ2022を有効に活用できるように構成してもよい。以下、その実施形態について説明する。

【0095】図11は、本発明の第2実施形態を示す印刷制御装置における文字種毎の1文字テーブル例を示す図であり、各テーブルTAB1～TAB4毎に1文字情報の格納数を変えてRAM2019上に作成される場合に対応する。

【0096】図10に示した各テーブルTAB1～TAB3では、1文字情報6006を100文字分確保していたが、JISX0208準拠の文字種の文字コードを表現するには2バイトを必要とするのに対し(以降、2バイト系文字と呼ぶ)、一方、JISX0201準拠の文字種の文字コードを表現するには1バイトしか必要としないため(以降、1バイト系文字と呼ぶ)、文字コード数の多い2バイト系文字に関しては1文字情報6006を100文字とし、文字コード数の少ない1バイト系文字に関しては1文字情報6006を50文字とする(図11のテーブルTAB3参照)。

【0097】さらに、2バイト系文字に対しても、JISX0208準拠の文字コードの非漢字(0x2121～0x2F7E)グループを200文字、第一水準漢字



(0x3021~0x4F7E)グループを100文字、第二水準漢字(0x5021~0x7E7E)グループを50文字とすることにより(図11のテーブル1、2、4参照)、一般的に使用頻度の高い非漢字、第一水準漢字、第二水準漢字の順に200文字、100文字、50文字というように段階的に1文字情報6006を割り当てるものとする。

【0098】これにより、一般的な文章構成に添ったメモリ構成をテーブルに対し採用することにより、管理メモリ2022を無駄なく有効に活用することが可能となる。

【0099】以下、図12に示すメモリマップを参照して本発明に係る印刷制御装置を適用可能な印刷システムで読み出し可能なデータ処理プログラムの構成について説明する。

【0100】図12は、本発明に係る印刷制御装置を適用可能な印刷システムで読み出し可能な各種データ処理プログラムを格納する記憶媒体のメモリマップを説明する図である。

【0101】なお、特に図示しないが、記憶媒体に記憶されるプログラム群を管理する情報、例えばバージョン情報、作成者等も記憶され、かつ、プログラム読み出し側のOS等に依存する情報、例えばプログラムを識別表示するアイコン等も記憶される場合もある。

【0102】さらに、各種プログラムに従属するデータも上記ディレクトリに管理されている。また、各種プログラムをコンピュータにインストールするためのプログラムや、インストールするプログラムが圧縮されている場合に、解凍するプログラム等も記憶される場合もある。

【0103】本実施形態における図3、図6、図7に示す機能が外部からインストールされるプログラムによって、ホストコンピュータにより遂行されていてもよい。そして、その場合、CD-ROMやフラッシュメモリやFD等の記憶媒体により、あるいはネットワークを介して外部の記憶媒体から、プログラムを含む情報群を出力装置に供給される場合でも本発明は適用されるものである。

【0104】以上のように、前述した実施形態の機能を実現するソフトウェアのプログラムコードを記録した記憶媒体を、システムあるいは装置に供給し、そのシステムあるいは装置のコンピュータ(またはCPUやMPU)が記憶媒体に格納されたプログラムコードを読み出し実行することによっても、本発明の目的が達成されることは言うまでもない。

【0105】この場合、記憶媒体から読み出されたプログラムコード自体が本発明の新規な機能を実現することになり、そのプログラムコードを記憶した記憶媒体は本発明を構成することになる。

【0106】プログラムコードを供給するための記憶媒

体としては、例えば、フロッピーディスク、ハードディスク、光ディスク、光磁気ディスク、CD-ROM、CD-R、磁気テープ、不揮発性のメモ리카ード、ROM、EEPROM等を用いることができる。

【0107】また、コンピュータが読み出したプログラムコードを実行することにより、前述した実施形態の機能が実現されるだけでなく、そのプログラムコードの指示に基づき、コンピュータ上で稼働しているOS(オペレーティングシステム)等が実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【0108】さらに、記憶媒体から読み出されたプログラムコードが、コンピュータに挿入された機能拡張ボードやコンピュータに接続された機能拡張ユニットに備わるメモリに書き込まれた後、そのプログラムコードの指示に基づき、その機能拡張ボードや機能拡張ユニットに備わるCPU等が実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【0109】

【発明の効果】以上説明したように、本発明に係る第1の発明によれば、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置であって、文字種毎に印刷可能な文字データ群を記憶する第1の記憶手段と、前記第1の記憶手段から文字種毎に読み出されるいずれか1つの文字データ群を記憶する第2の記憶手段と、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成手段と、前記作成手段により作成された各文字情報管理テーブルに基づいて前記第1の記憶手段に記憶されるいずれか1つの文字データ群を前記第2の記憶手段に対して順次読み込む制御手段とを有し、前記制御手段は、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理するので、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮することができる。

【0110】第2の発明によれば、前記第2の記憶手段に対するアクセス速度は、前記第1の記憶手段に対するアクセス速度よりも高速とするので、最終的な印刷データを描画する処理時間を大幅に短縮して全体としてページ単位の印刷処理を高速化することができる。

【0111】第3の発明によれば、前記第1の記憶手段は、不揮発性メモリ媒体で構成するので、文字種毎の文字データ群を再現性よく読み出すことができる。

【0112】第4の発明によれば、前記第2の記憶手段は、揮発性メモリ媒体で構成するので、読み出した文字

種毎の文字データ群から最終的な印刷イメージを生成するのに要するメモリアクセスを高速化することができる。

【0113】第5、第6の発明によれば、所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を制御する印刷制御装置のデータ処理方法であって、あるいは所定の通信媒体を介して情報処理装置より入力される制御コマンドに基づき印刷部の印刷処理を行う印刷装置を制御するコンピュータが読み出し可能なプログラムを格納した記憶媒体であって、前記情報処理装置より入力される制御コマンドを解析して印刷すべき文字データの文字情報管理テーブルを文字種毎に作成する作成工程と、前記作成工程により作成された各文字情報管理テーブルに基づいて第1の記憶手段に記憶される各文字データ群を第2の記憶手段に順次読み込む読み込み工程と、前記第2の記憶手段に読み込んだ文字データ群を順次参照して印刷可能な文字データを文字種毎に描画処理する描画工程とを有するので、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮することができる。

【0114】従って、文字種が混在する文字データの印刷要求がなされた場合でも、第1の記憶手段に対して文字種毎に記憶された文字データ群を第2の記憶手段に読み込む回数を削減でき、最終的な印刷データを描画する処理時間を大幅に短縮して高速に印刷イメージを描画処理することができる等の効果を奏する。

#### 【図面の簡単な説明】

【図1】本発明を適用可能な出力装置の構成を示す断面図である。

【図2】本発明の第1実施形態を示す印刷制御装置を適用可能な印刷システムの構成を説明するブロック図である。

【図3】本発明に係る印刷制御装置における第1のデータ処理手順の一例を示すフローチャートである。

【図4】図2に示した管理メモリ上に構築される文字情報管理テーブルの構成を説明する図である。

【図5】図4に示した文字情報管理テーブルを複数個管理する例を説明する図である。

【図6】本発明に係る印刷制御装置における第2のデータ処理手順の一例を示すフローチャートである。

【図7】本発明に係る印刷制御装置における第3のデータ処理手順の一例を示すフローチャートである。

【図8】図1に示した印刷部で印刷される文字印刷処理例を示す図である。

【図9】図8に示した文字印刷処理例における文字列の詳細構成を説明する図である。

【図10】図8に示した文字列に対して作成されるテーブル例を示す図である。

【図11】本発明の第2実施形態を示す印刷制御装置における文字種毎の1文字テーブル例を示す図である。

【図12】本発明に係る印刷制御装置を適用可能な印刷システムで読み出し可能な各種データ処理プログラムを格納する記憶媒体のメモリマップを説明する図である。

#### 【符号の説明】

(ホストコンピュータ)

2001 CPU

2002 RAM

2003 フォントROM、プログラムROM

2004 システムバス

2005 KBC

2006 CRTC

2007 MC

2008 PRTC

2009 KB

2010 CRT

2011 外部メモリ

2021 双方向I/Fケーブル

2100 ホストコンピュータ

(プリンタ)

2012 CPU

2013 プログラムROM

2014 外部メモリ

2015 システムバス

2016 印刷部I/F

2017 印刷部

2018 入力部

2019 RAM

2020 MC

2022 管理メモリ

1000 プリンタ

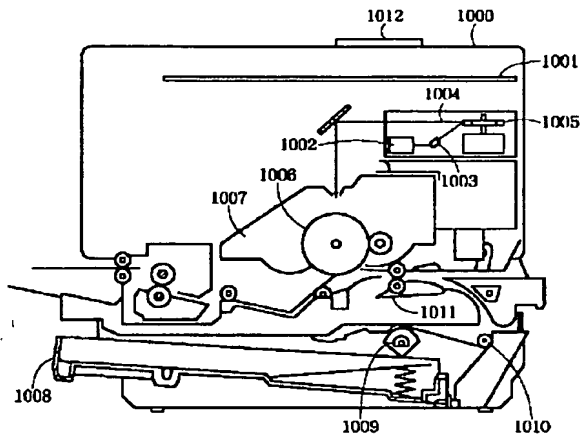
1001 プリンタ制御ユニット

1012 操作パネル

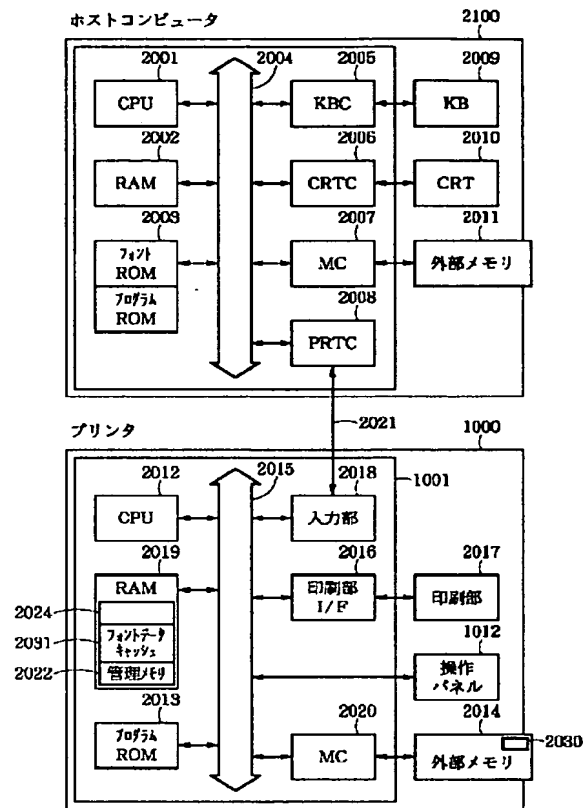
#### 【図9】

印字基準点 文字コード表 JIS 1 水

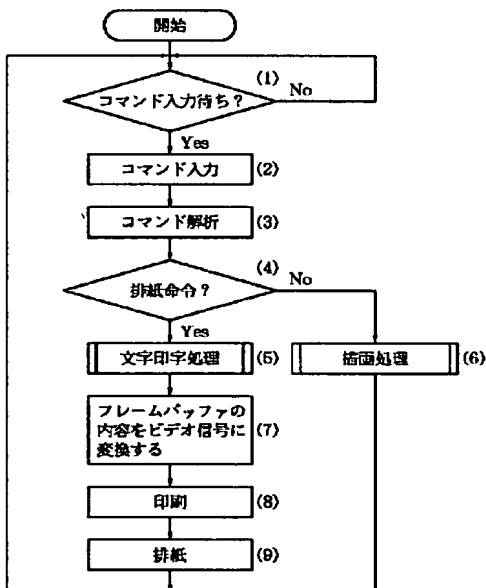
【図 1】



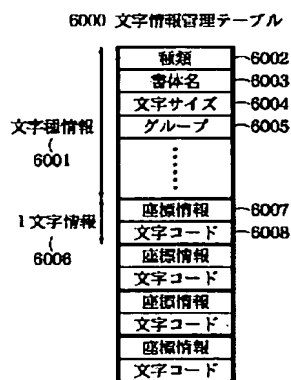
【図 2】



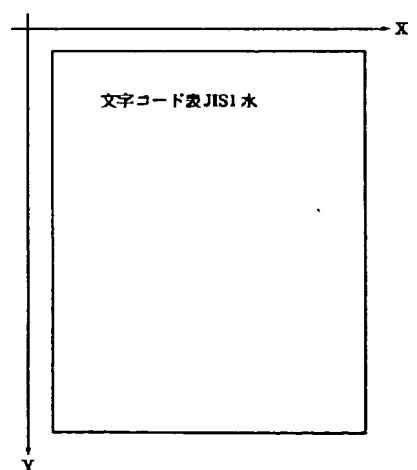
【図 3】



【図 4】



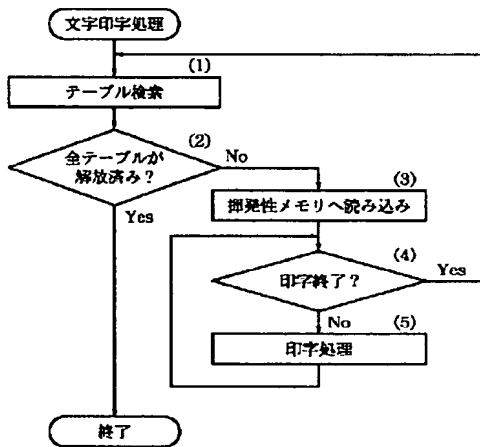
【図 8】



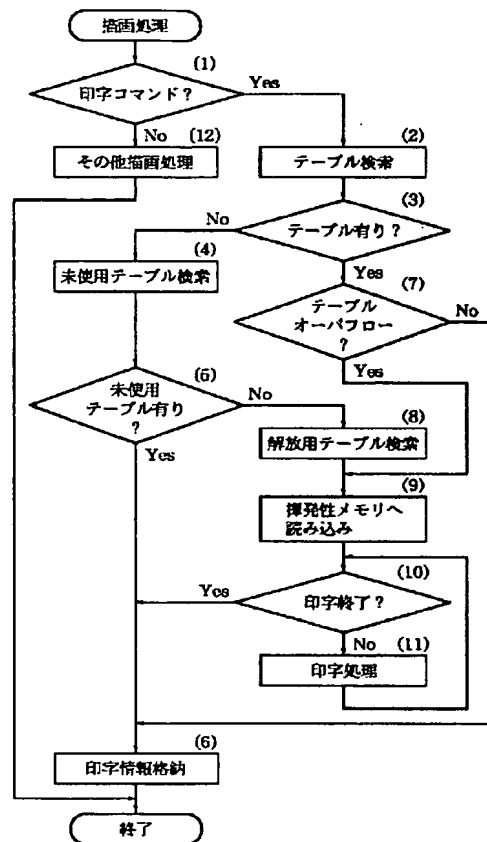
【図5】

	テーブルTAB1	テーブルTAB2	テーブルTAB3
文字種情報 (合計40バイト)	種類(4バイト)	種類(4バイト)	種類(4バイト)
	書体名(20バイト)	書体名(20バイト)	書体名(20バイト)
	文字サイズ(4バイト)	文字サイズ(4バイト)	文字サイズ(4バイト)
	アスキー(12バイト)	アスキー(12バイト)	アスキー(12バイト)
1文字情報 (合計10バイト)	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
文字コード[0]	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)
文字コード[1]	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)
文字コード[2]	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)
文字コード[3]	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)
...	...	...	...
文字コード[98]	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)
文字コード[99]	座標情報(8バイト)	座標情報(8バイト)	座標情報(8バイト)
	文字コード(2バイト)	文字コード(2バイト)	文字コード(2バイト)

【図7】



【図6】



【図10】

	テーブルTAB1	テーブルTAB2	テーブルTAB3
	アスキーアット	アスキーアット	アスキーアット
	明朝体	明朝体	7-9x
	108インチ	108インチ	108インチ
	JIS漢字1水	JIS非漢字	ローマ字
	(50, 50)	(78, 50)	(134, 50)
文字コード[0]	0x4A38"文"	0x2533"コ"	0x4A"J"
	(64, 50)	(92, 50)	(148, 50)
文字コード[1]	0x3B7A"字"	0x213C"ー"	0x49"1"
	(120, 50)	(108, 50)	(182, 50)
文字コード[2]	0x498D"表"	0x2549"ド"	0x53"6"
	(190, 50)	(178, 50)	未使用
文字コード[3]	0x3F65"水"	0x2331"1"	未使用
	未使用	未使用	未使用
文字コード[4]	未使用	未使用	未使用
	未使用	未使用	未使用
文字コード[5]	未使用	未使用	未使用
	未使用	未使用	未使用
...	...	...	...
文字コード[99]	未使用	未使用	未使用
	未使用	未使用	未使用

【図 1 1】

	テーブルTAB1	テーブルTAB2	テーブルTAB3	テーブルTAB4
	7ビットバイト	7ビットバイト	7ビットバイト	7ビットバイト
	明朝体	明朝体	明朝体	明朝体
	10ビット	10ビット	10ビット	10ビット
	JIS漢字1水	JIS非漢字	ローマ字	JIS漢字2水
[0]	(50, 50)	(78, 50)	(134, 50)	未使用
	0x4A38"文"	0x2533"コ"	0x4A"J"	未使用
[1]	(64, 50)	(92, 50)	(148, 50)	...
	0x387A"字"	0x213C"ー"	0x4B"1"	...
[2]	(120, 50)	(106, 50)	(182, 50)	...
	0x493D"表"	0x2549"下"	0x53"S"	...
[3]	(190, 50)	(176, 50)	未使用	...
	0x3F85"水"	0x2331"1"	未使用	...
[4]	未使用	未使用	...	...
	未使用	未使用	...	...
[49]	...	...	...	...
	...	...	...	...
[99]	未使用	...	...	...
	未使用	...	...	...
[199]	...	...	...	...
	...	...	...	...
	未使用	未使用	未使用	未使用
	未使用	未使用	未使用	未使用

【図 1 2】

FD/CD-ROM等の記憶媒体
ディレクトリ情報
第1のデータ処理プログラム 図3に示すフローチャートのステップに対応するプログラムコード群
第2のデータ処理プログラム 図6に示すフローチャートのステップに対応するプログラムコード群
第3のデータ処理プログラム 図7に示すフローチャートのステップに対応するプログラムコード群
...
未使用
未使用

記憶媒体のメモリマップ

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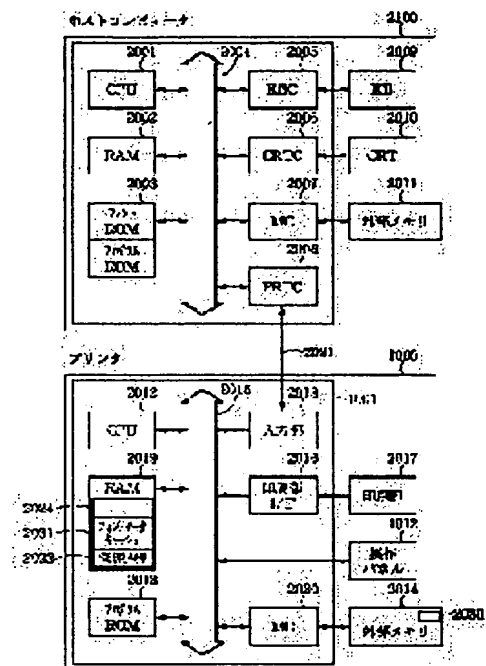
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(54) PRINTING CONTROLLER, DATA PROCESSING METHOD FOR THE SAME, AND STORAGE MEDIUM STORING COMPUTER-READABLE PROGRAM

(57)Abstract:

**PROBLEM TO BE SOLVED:** To execute a printing image drawing process at high speed by reducing the number of times where a character data group stored in the first storage means by each character kind is read into the second storage means, even if printing of character data where character kinds are present in random is requested.

**SOLUTION:** A character data group for each character kind is stored in an external memory 2014 beforehand, a character information management table to manage character data analyzed by kinds of characters is prepared on a management memory 2022 at a time when a printing request is made, the table is referred to and a character data group for each kind of character stored is read into a data cache memory 2031, and the read character data group is referred to and character data that becomes a final print image are drawn by a CPU 2012 on a RAM 2019.



## LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] It is the print control unit which is equipped with the following and characterized by the aforementioned control means carrying out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one. The 1st storage means which is the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and memorizes the alphabetic-data group which can be printed for every character kind The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind A creation means to create the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind Control means which read any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means one by one to the storage means of the above 2nd

[Claim 2] The access speed to the storage means of the above 2nd is a print control unit according to claim 1 characterized by supposing that it is more nearly high-speed than the access speed to the storage means of the above 1st.

[Claim 3] The storage means of the above 1st is a print control unit according to claim 1 or 2 characterized by constituting from a non-volatile memory medium.

[Claim 4] The storage means of the above 2nd is a print control unit according to claim 1 or 2 characterized by constituting from a volatile-memory medium.

[Claim 5] The data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media characterized by providing the following The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, and the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group which read into the storage means of the above 2nd one by one

[Claim 6] The storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through the predetermined communication media characterized by providing the following can read The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, and the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group which read into the storage means of the above 2nd one by one

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the storage which stored the data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and a print control unit, and the program which a computer can read.

[0002]

[Description of the Prior Art] Although mass external memory, such as a magnetic disk, was used in this kind of printing system since huge alphabetic datas, such as two or more different typefaces, character sizes, etc., were stored, generally the access speed of nonvolatile MEMORIHE, such as a magnetic disk, is slow, since it is necessary to read an alphabetic data per [ non-volatile memory ] one character in the case of printing, the number of times of access of nonvolatile MEMORIHE increases, and high-speed printing is difficult, and it is \*\*\*\*\*.

[0003] Then, in order to reduce the number of times of access of nonvolatile MEMORIHE, by access of RAM etc. copying an alphabetic data with high-speed volatile MEMORIHE from non-volatile memory in group units, such as a suitable character kind, for example, a typeface, and a character size, and referring to each alphabetic data from volatile memory, the number of times of access of nonvolatile MEMORIHE was reduced, and high-speed printing was planned.

[0004]

[Problem(s) to be Solved by the Invention] However, there is a fault that product cost goes up since only the memory space which carries out volatile MEMORIHE storing of the alphabetic data for character kinds (a typeface, character size, etc.) is required of the above-mentioned method. furthermore, in performing printing which a limitation stores one typeface and the alphabetic data for 1 character size by the capacity of volatile memory, and uses two or more typefaces and character sizes Whenever the character kind changed, the volatile MEMORIHE alphabetic data needed to be read from non-volatile memory, the time loss occurred by the increase in this reading processing, and there was also a trouble that printing processing speed fell.

[0005] this invention is what was made in order to cancel the above-mentioned trouble. the purpose of this invention Access speed stores beforehand the alphabetic-data group for every character kind in a low speed storage. The alphabetic information managed table which manages the alphabetic data analyzed by the printing demand for every character kind is created. The alphabetic-data group for every character kind memorized with reference to this table is read into a storage with a high-speed access speed. this -- by carrying out drawing processing of the alphabetic data which serves as a final printing image with reference to the alphabetic-data group read into the high-speed storage Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down. It is offering the storage which stored the data-processing method of the print control unit which can shorten sharply the processing time which draws final print data, and can carry out drawing processing of the printing image at high speed, and a print control unit, and the program which a computer's can read.

[0006]

[Means for Solving the Problem] The 1st storage means which the 1st invention concerning this invention is a print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and memorizes the alphabetic-data group which can be printed for every character kind, The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind, A creation means to create the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, It has the control means which read any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means one by one to the storage means of the above 2nd. The aforementioned control means carry out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0007] The access speed to the storage means of the above 2nd makes 2nd invention concerning this invention more nearly high-speed than the access speed to the storage means of the above 1st.



[0008] The 3rd invention concerning this invention constitutes the storage means of the above 1st from a non-volatile memory medium.

[0009] The 4th invention concerning this invention constitutes the storage means of the above 2nd from a volatile-memory medium.

[0010] The 5th invention concerning this invention is the data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind. The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one. It has the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0011] The 6th invention concerning this invention is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind. The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one. The program which a computer can read is stored in a storage for having the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0012]

[Embodiments of the Invention] It explains referring to drawing 1 - drawing 3 about the composition of a suitable laser beam printer to apply this operation form and an ink jet printer, before explaining the composition of this operation form. In addition, the printer which applies this operation form is not restricted to a laser beam printer and an ink jet printer, and cannot be overemphasized by that the printer of other print methods may be used.

[0013] Drawing 1 is the cross section showing the composition of the output unit which can apply this invention, and a metaphor shows the case of a laser beam printer (LBP).

[0014] In drawing, 1000 is a LBP main part, creates a character pattern, a form pattern, etc. which correspond according to those information, and forms an image in the recording paper which is a record medium while it inputs and memorizes printed information (character code etc.), form information, or microinstruction supplied from the host computer connected outside. The control panel with which, as for 1012, a switch, a Light Emitting Diode drop, etc. for a scan are arranged, and 1001 are printer control units, and analyze the alphabetic information supplied from control and the host computer of the LBP main part 1000 whole. Mainly, alphabetic information is changed into the video signal of a corresponding character pattern, and this printer control unit 1001 outputs it to the laser driver 1002.

[0015] The laser driver 1002 is a circuit for driving semiconductor laser 1003, and carries out the on-off switch of the laser beam 1004 discharged from semiconductor laser 1003 according to the inputted video signal. It is made to shake a laser beam 1004 at a longitudinal direction by the rotating polygon 1005, and it carries out scanning exposure of the electrostatic drum 1006 top. By this, the electrostatic latent image of a character pattern will be formed on the electrostatic drum 1006. After this latent image is developed by the development unit 1007 arranged at the electrostatic drum 1006 circumference, it is imprinted by the recording paper.

[0016] Using a cut sheet in this recording paper, the cut sheet recording paper is contained at the form cassette 1008 with which the LBP main part 1000 was equipped, is called feed roller 1009, with the conveyance roller 1010 and the conveyance roller 1011, is incorporated in equipment and supplied to the electrostatic drum 1006. Moreover, the LBP main part 1000 is equipped with at least one or more card slots which are not illustrated, and it is constituted so that an option font card and the control card (emulation card) from which a language system differs can be connected in addition to a built-in font.

[0017] The [1st operation form] Drawing 2 is a block diagram explaining the printing structure of a system which can apply the print control unit which shows the 1st operation form of this invention. Here, a laser beam printer (drawing 1) is made into an example, and is explained. In addition, if the function of this invention is performed, even if it is the system by which processing is performed through networks, such as LAN, even if it is the system which consists of two or more devices even if it is the device of a simple substance, it cannot be overemphasized that this invention is applicable.

[0018] Moreover, this invention cannot be overemphasized by that it can apply when carrying out by supplying a program to a system or equipment. In this case, the storage which stored the program concerning this invention will constitute this invention. And when a system or equipment reads the program from this storage, the system or equipment operates in the procedure defined beforehand.

[0019] In drawing 2, 2100 is a host computer, it has CPU2001 which performs the document processing system in which the figure, the image, the character, the table (a spreadsheet etc. is included), etc. were intermingled based on the document processing system program memorized by ROM for a program of ROM2003, and CPU2001 controls each device connected to a system bus 2004 in the gross. Moreover, the control program of CPU2001 etc. is

memorized to ROM for a program of this ROM2003, and the font data used in the case of the above-mentioned document processing system is memorized to ROM for fonts of ROM2003.

[0020] 2002 is RAM and functions as the main memory of CPU2001, a work area, etc. 2005 is a keyboard controller (KBC) and controls the key input from a keyboard 2009 or a non-illustrated pointing device. 2006 is a CRT controller (CRTC) and controls the display of CRT display (CRT) 2010.

[0021] 2007 is a memory controller (MC) and controls access with the external memory 2011 which memorizes a boot program, various applications, font data, a user file, an edit file, etc., such as a hard disk (HD) and a floppy disk (FD).

[0022] 2008 is a printer controller (PRTC), and it connects with a printer 1000 through the predetermined bidirection interface (interface) 2021, and it performs communications control processing with a printer 1000. In addition, CPU2001 performs expansion (rasterize) processing of the outline font to the display information RAM set up for example, on RAM2002, and makes WYSIWYG on CRT2010 possible. Moreover, CPU2001 opens the various windows registered based on the command directed by the mouse cursor which is not illustrated on CRT2010, and performs various data processing.

[0023] In a printer 1000, 2012 is Printer CPU, controls access with various kinds of devices connected to a system bus 2015 based on the control program memorized by external memory 2014, such as a control program memorized by ROM for a program of ROM2013, in the gross, and outputs the picture signal as a print-out to the printing section (printer engine) 2017 connected through the printing section interface (printing interface I/F) 2016.

[0024] Moreover, to ROM for a program of this ROM2013, the control program of CPU2012 as shown with the flow chart of drawing 3, drawing 6, and drawing 7 etc. is memorized.

[0025] The communications processing with a host computer 2100 of CPU2012 has become possible through the input section 2018, and the host computer 2100 constitutes the information in a printer 1000 etc. possible [ a notice ].

[0026] 2019 is RAM, and it is constituted so that memory space can be extended by the option RAM which functions as the main memory of CPU2012, a work area, etc., and is connected to the extension port which is not illustrated. In addition, RAM2019 is used as the receive buffer for storing the print data (printer control code (Page Description Language)) which received from the print-out expansion field (frame buffer 2024), the environmental data storage field, and the host computer 2100, or work memory of the font data cache memory 2031 grade for storing temporarily the font data 2030 read from the below-mentioned nonvolatile external memory 2014.

[0027] Moreover, a part of RAM2019 is assigned also as management memory 2022 for dividing printed information to print, such as a character kind of a character, and a character code, per character kind, and managing it.

[0028] It is external memory for memorizing the font data 2030, such as an outline font and a bit-mapped font, access of a hard disk (HD) etc. consists of low speed non-volatile memory, and external memory 2014 has access controlled by the memory controller (MC) 2020.

[0029] Moreover, external memory 2014 may be constituted so that not only one piece but the program which interprets the printer control code from which it has at least one or more pieces, and option font data and a language system differ in addition to above-mentioned font data may be stored.

[0030] 1012 is the control panel mentioned above and a switch, a Light Emitting Diode drop, etc. for operation are arranged. Furthermore, it has NVRAM which is not illustrated and you may make it memorize the printer mode setting information from a control panel 1012.

[0031] In addition, this operation gestalt explains the example which was adapted for the printer (printer 1000) which receives the printer control code to which the print control unit was transmitted from the host computer 2100, and performs a printout.

[0032] Hereafter, the characteristic composition of this operation gestalt is explained with reference to drawing 2 etc.

[0033] It is the print control unit (printer control unit 1001) which controls printing processing of the printing section based on the control command inputted from an information processor through the predetermined communication media (a network, interface) constituted as mentioned above. The 1st storage means which memorizes the alphabetic-data group which can be printed for every character kind (external memory 2014), The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind (font data cache memory 2031 of RAM2019). The control command inputted from the aforementioned information processor is analyzed. A creation means (it creates, as the control program with which CPU2012 was memorized by ROM2031 and the external memory 2014 grade is performed and it is shown on the management memory 2022 at drawing 10) to create the alphabetic information managed table of the alphabetic data which should be printed for every character kind. The storage means of the above 2nd is received in any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means. It has the control means (CPU2012 performs, reads and processes the control program memorized by ROM2031 and the external memory 2014 grade) read one by one. the aforementioned control means Since drawing processing of the alphabetic data which can be printed is carried out for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0034] Moreover, since [ the access speed to the storage means (RAM2019) of the above 2nd ] it is more nearly high-speed than the access speed to the storage means (external memory 2014) of the above 1st, it can shorten sharply the processing time which draws final print data, and can accelerate printing processing of a page unit as a whole.

[0035] Furthermore, since the storage means (external memory 2030) of the above 1st is constituted from a non-volatile memory medium, it can read the alphabetic-data group for every character kind with sufficient repeatability.

[0036] Moreover, since the storage means (RAM2019) of the above 2nd is constituted from a volatile-memory medium, it can accelerate the memory access taken to generate a final printing image from the alphabetic-data group for every read character kind.

[0037] Drawing 3 is a flow chart which shows an example of the 1st data-processing procedure in the print control unit concerning this invention, and corresponds to the procedure of the printer 1000 shown in drawing 2 . In addition, with this operation form, if a printer control code is received from a host computer 2100, interruption starts CPU2012 and a printer control code is stored with receiving BAFFAHE on RAM2019. That is, reception is performed in parallel with processing of drawing 3 . However, since the feature is not necessarily in this processing itself, the explanation is omitted. In addition, (1) - (9) shows each step.

[0038] First, at a step (1), if a printer control code is inputted from a host computer 2100, a printer 1000 escapes from a data input waiting state, will be a step (2) and will perform printer control-code input process.

[0039] Next, although processing which analyzed the inputted printer control code and followed each command at the step (3) is performed At a step (4), when a delivery command is analyzed as this command It is a step (7) after performing character drawing processing (it mentions later for details) at a step (5). At a step (8), the content of a frame buffer 2042 is changed into a video signal, and it prints by transmitting the picture signal as a print-out to the printing section (printer engine) 2017, and by the step (9), paper is delivered to a form and it returns to a step (1).

[0040] On the other hand, when it judges with having analyzed the command of others except a delivery command, after performing drawing processing according to each command and forming a printing image on a frame buffer 2024 by the step (6) at a step (4), it returns to a step (1).

[0041] Here, the composition of the alphabetic information managed table 6000 stored on the management memory 2022 of the printer 1000 interior shown in drawing 2 is explained using drawing 4 .

[0042] Drawing 4 is drawing explaining the composition of the alphabetic information managed table built on the management memory 2022 shown in drawing 2 .

[0043] In drawing, 6000 is an alphabetic information managed table, when the printer control code inputted at the step (6) shown in drawing 3 is a printing command, it is for managing the alphabetic information suggested by this command, and the flowchart of below-mentioned drawing 6 is accompanied, and it is controlled.

[0044] The alphabetic information managed table 6000 consists of character kind information 6001 and 1 alphabetic information 6006. Furthermore, the character kind information 6001 consists of two or more following parameters, in order to distinguish a character kind.

[0045] 6002 is a kind and the information for distinguishing the kind of fonts, such as an outline font and a bit-mapped font, is set up. 6003 is a typeface name, for example, the information for distinguishing typeface names, such as a Mincho typeface, a block letter, Dutch, and a courier, is set up. 6004 is a character size, for example, the information for distinguishing character sizes, such as eight points, ten points, and 12 etc. points, is set up. 6005 is a group and the information for carrying out division management according to the kind of character is set up.

[0046] As an example of a group 6005, the character code of JISX0208 conformity A non-kanji character (0x2121-0x2F7E), What [ was divided into Chinese characters of the first level (0x3021-0x4F7E) and three Chinese characters of the second level (0x5021-0x7E7E) ] Or what divided the character code of JISX0201 conformity into two, a Roman alphabet (0x00-0x7F) and katakana (0x80-0xFF), is shown.

[0047] Moreover, what divided the whole sentence character code of JISX0208 conformity by arbitrary numbers about the group division besides the above setup shall be used. In addition, if it is the information for distinguishing a character kind, the information except having stated in the top shall also be used.

[0048] Furthermore, 1 alphabetic information 6006 serves as a parameter in every character belonging to the character kind information 6001. It consists of the coordinate information 6007 and character codes 6008 which defined XY coordinate as the printing position of a character. In addition, the alphabetic information managed table 6000 shall set up arbitrary numbers of 1 alphabetic information to one.

[0049] Moreover, although the alphabetic information managed table 6000 is attached to an one-character kind and it is one, it makes it possible to own two or more alphabetic information managed tables by within the limits which a memory size allows on the management memory 2022.

[0050] Thus, by having the alphabetic information managed table 6000 two or more places, it becomes possible to distribute each alphabetic information by which printing specification was distributed and carried out into the printer control code on the alphabetic information managed table 6000 with the respectively same character attribute.

[0051] In addition, alphabetic information shall consist of the printing coordinates and character codes for constituting the character kind for defining the character kind information 6001, and 1 alphabetic information 6006. Moreover, alphabetic information explains the generation processing with reference to below-mentioned drawing 6 and drawing 7 , although the alphabetic information managed table (it is only called a table below) 6000 is generated when inputted by the host 2100 as a printer control code.

[0052] Drawing 5 is drawing explaining the example which manages two or more alphabetic information managed tables 6000 shown in drawing 4 .

[0053] 4 bytes is assigned to 20 bytes and a character size 6004, 12 bytes and a total of 40 bytes are assigned to the kind 6002 of character kind information 6001 in a group 6005 at 4 bytes and the typeface name 6003 as shown to drawing 5 by this example, 8 bytes is assigned to the coordinate information 6007 on 1 alphabetic information 6006, 2 bytes and a total of 10 bytes are assigned to a character code 6008, and the storing field of 1 alphabetic information is owned by 100 characters.

[0054] Moreover, in this example, 1040 bytes per one table of management memory 2022 is consumed. Furthermore, by carrying out three-set (table [ TAB / TAB - / 3 ] 1) preparation of the above-mentioned table, a character kind which is different by 100 characters in 1 alphabetic information 6006 of the same character kind can be managed by three sets, and 1040 byte x three-set = 3120 bytes of management memory 2022 is consumed.

[0055] In addition, although the table of 100 characters per one-character kind was made into three sets in this example, it makes it possible to set up the number freely within limits which the memory size of the management memory 2022 allows.

[0056] Drawing 6 is a flow chart which shows an example of the 2nd data-processing procedure in the print control unit concerning this invention, and corresponds to the table supervisory control procedure in the drawing processing shown in the step (6) shown in drawing 3. In addition, (1) - (12) shows each step.

[0057] First, with this operation gestalt, although other drawing processings meeting each command are performed and printing processing is performed by the step (12) at a step (1) when it judges whether the printer control code inputted from the host computer 2100 is alphabetic information and it is judged that it is except printed information, since the feature is not necessarily in this processing, concrete explanation shall be omitted.

[0058] On the other hand, at a step (2), when it is judged that it is printed information, in order to register alphabetic information on a table, the table in the management memory 2022 is searched with a step (1). And when it is judged based on this reference result that it judges whether the table which is equivalent to the character kind of the above-mentioned alphabetic information at a step (3) exists, and a table does not exist, since it is necessary to generate a table newly, an intact table is searched with a step (4).

[0059] And at a step (5), when it is judged that it judges and an intact table exists whether an intact table exists, by the step (6), the character kind information 6001 is generated from the character kind in alphabetic information, and one 1 alphabetic information 6006 is further stored from a printing coordinate and a character code.

[0060] In addition, all tables shall be initialized at the time of the input start of a printer control code.

[0061] On the other hand, at a step (5), by the step (8), a used table is released to \*\* judged that the intact table 6000 does not exist, and an intact table is secured to it. Here, release of a used table performs printing processing based on all 1 alphabetic information 6006 stored in the table, and means emptying 1 alphabetic information. Moreover, 1 alphabetic information in a table is the thing of a printing schedule, and actual printing processing ends it by drawing on a frame buffer 2024 based on sympathy news (this processing is henceforth called release processing).

[0062] In a step (8), the table which releases is specifically searched, and the table released from a reference result is chosen. Although two or more tables exist and one table is chosen from this inside, the following methods are taken as criteria for selection of a table. First, one table which searches all tables and stores most 1 alphabetic information 6006 is chosen.

[0063] Here, when two or more tables with the equivalent number of storing of 1 alphabetic information exist, one arbitrary table is chosen. By choosing a table based on these criteria for selection, since all the storing fields of 1 alphabetic information 6006 were consumed, the state (this state is henceforth called table overflow) of stopping being able to carry out additional storing of the 1 alphabetic information becomes possible [ releasing preferentially the table which is easiest to generate ].

[0064] Next, after the table released at a step (7) is chosen at a step (8), the font data 2030 equivalent to the character kind of this table is read into up to the font data cache 2031 from external memory 2014 at a step (9).

[0065] Here, font data 2030 shall read all the data of the corresponding character kind regardless of 1 alphabetic information stored in the table. However, the font data cache 2031 is premised on securing only the field which can read the required font data 2030 altogether.

[0066] Then, at a step (10), based on all 1 alphabetic information stored in the table, it draws on a frame buffer 2024, and printing processing is performed at a step (11) and it returns to a step (10) until it is judged with all printings having been completed.

[0067] On the other hand, at a step (10), when judged with a printing end, by the step (6), new alphabetic information is stored into the released table, and processing is ended.

[0068] It becomes possible to prevent the time loss by too much access of nonvolatile MEMORIHE by printing the font data 2030, such as a bit-mapped font and an outline font, here using the font data 2030 stored in the font data cache 2031 in the printing processing in a step (10).

[0069] In addition, with this operation gestalt, since the feature is not necessarily in the printing processing itself which uses font data 2030, the explanation is omitted.

[0070] When it judges whether a table overflow occurs at a step (7) when it is judged that the table which is equivalent to the character kind of alphabetic information at a step (3) on the other hand exists, and a table overflow does not occur, it progresses to a step (6), printed information is stored, and processing is ended.

[0071] On the other hand, by the step (7), when it judges with a table overflow occurring, after performing release processing of this table by step (9) - (11), at a step (6), printed information is stored to this table and processing is ended.

[0072] Next, with reference to the flow chart shown in drawing 7, the alphabetic printing procedure in the step (5) shown in drawing 3 is explained in full detail.

[0073] Drawing 7 forms the whole sentence character of a printing schedule as a printing image on a frame buffer 2024 by this BEJI by corresponding to the procedure for releasing all the tables in which showing an example of the 3rd data-processing procedure in the print control unit concerning this invention and that are flow charts and were generated on this page before delivery, and releasing the whole sentence character in a table according to this processing. In addition, (1) – (5) shows each step.

[0074] First, processing is ended, when all tables are searched with a step (1), it judges whether there is any non-released table at a step (2) and all tables are judged to be release ending.

[0075] On the other hand, when it judges with a non-released table existing at a step (2), it is a step (3) and the font data 2030 equivalent to the character kind of this table is read into up to the font data cache 2031 from external memory 2014.

[0076] Here, font data 2030 shall read all the alphabetic datas of the corresponding character kind regardless of 1 alphabetic information stored in the table. However, the font data cache 2031 is premised on securing only the field which can read the required font data 2030 altogether.

[0077] Then, at a step (4), based on all 1 alphabetic information stored in the table, it draws on a frame buffer 2024, and printing processing is performed at a step (5) and it returns to a step (4) until it judges that the end, i.e., printing processing, was completed by all drawing processings.

[0078] On the other hand, at a step (4), when judged with a printing end, it returns to a step (1).

[0079] Here, the concrete example of the table created according to the flow chart shown in drawing 6 is explained using drawing 8 – drawing 10.

[0080] Drawing 8 is drawing showing the example of alphabetic printing processing printed in the printing section 2017 shown in drawing 2, and is the case where the "character code table JIS1 water" as alphabetic information which corresponded to the printing image over the recording paper, and was inputted above the recording paper is printed.

[0081] In drawing 8, a longitudinal direction and lengthwise arrow is an axis of coordinates for defining the printing position of the above-mentioned character string, to the recording paper, the X-axis is set as the longitudinal direction and the Y-axis is set as lengthwise.

[0082] In addition, the case where the coordinate unit of the same axle is defined as 1/100 inch by this example is explained.

[0083] Drawing 9 is drawing explaining the detailed composition of the character string in the example of alphabetic printing processing shown in drawing 8, the enlarged display of the "character code table JIS1 water" is carried out, it is stylish, the width-of-face quantity in every character is surrounded, and the lower left edge of each frame shows the printing reference point of each character.

[0084] In drawing 9, in this character string, "1 water" shall use ten points of Mincho typefaces of an outline font with the "character code table", and "JIS" shall use ten points of the courier typeface of an outline font.

[0085] Drawing 10 is drawing showing the example of a table created to the character string shown in drawing 8. The character kind of a table TAB 1 The Chinese characters of the first level of JISX0208 conformity of ten points of Mincho typefaces of an outline font, The character kind of a table TAB 2 The first level non-kanji character of JISX0208 conformity of ten points of Mincho typefaces of an outline font, The character kind of a table TAB 3 is assigning the Roman alphabet of the JISX0201 conformity of ten points of the courier typeface of an outline font, and has secured 1 alphabetic information by 100 characters to each table.

[0086] In addition, "KO", "-", "DO", and "1" are assigned to a table TAB 2, and "J", "I", and "S" are assigned to the table TAB 1 for the "sentence" among the character strings of drawing 8, a "character", a "table", and "water" at the table TAB 3.

[0087] moreover — drawing 10 — being shown — one — alphabetic information — 6006 — inside — a coordinate — information — 6007 — \*\*\*\* — printing — a coordinate — a unit — one — / — 100 — an inch — \*\* — having carried out — a case — printing — a coordinate — " (an X coordinate, Y coordinate) — " — expressing — \*\*\*\* .

[0088] By performing printing processing based on three tables TAB1-TAB3 shown in drawing 10 as mentioned above, it becomes possible to control the number of times of access to external memory 2014 to 3 times.

[0089] In addition, although it is possible to carry out a group division, and for it to become unnecessary to read into a non-kanji character and the kanji individually, and to reduce further the number of times of access to external memory 2014 as shown in drawing 10 when the capacity which can read the font data 2030 for one typeface on the font data cache memory 2031 shown in drawing 2 is securable, since it is necessary to prepare the huge memory which reads the font data for one typeface, there is a fault that memory efficiency becomes bad.

[0090] On the other hand, if font data 2030 is read for every character, the advantage that the font data cache memory 2031 is little, and ends has the fault that the number of times of access of external memory 2014 HE of a certain thing increases.

[0091] Though the font data cache memory 2031 restricted in memory space by controlling printing processing according to this operation form is used, the number of times of reading of the font data 2030 from external memory 2014 can be cut down, and high-speed printing processing is attained.

[0092] Hereafter, the characteristic composition of this operation form is explained with reference to drawing 6, drawing 7, etc.

[0093] It is the data-processing method of the print control unit (printer control unit 1001) which controls printing

processing of the printing section based on the control command inputted from an information processor (host computer 2100) through the predetermined communication media constituted as mentioned above. Or it is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind (step [ of drawing 6 ] (1) - (9)), The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means (external memory 2030) based on each alphabetic information managed table created by the aforementioned creation process one by one (step [ of drawing 7 ] (1) - (3)), the drawing process (the step (4) of drawing 7 —) which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means (font data cache memory 2031 on RAM2019) of the above 2nd one by one Since it had (5), even when the printing demand of the alphabetic data in which a character kind is intermingled is made The number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0094] The [2nd operation form] Although the aforementioned 1st operation form explained the case where the number of storing of 1 alphabetic information 6006 in each table was made into the same number, you may constitute from a 2nd operation form by changing the number of storing of 1 alphabetic information for every table so that the management memory 2022 can be utilized effectively. Hereafter, the operation form is explained.

[0095] Drawing 11 is drawing showing the example of an one-character table for every character kind in the print control unit which shows the 2nd operation form of this invention, and when the number of storing of 1 alphabetic information is changed every tables TAB [ TAB1-] 4 and it is created on RAM2019, it corresponds.

[0096] Although 1 alphabetic information 6006 was secured by 100 characters on each tables TAB1-TAB3 shown in drawing 10 As opposed to needing 2 bytes for expressing the character code of the character kind of JISX0208 conformity (henceforth) it is called a 2-byte system character — since only 1 byte is needed for on the other hand expressing the character code of the character kind of JISX0201 conformity (henceforth) 1 alphabetic information 6006 is made into 100 characters about the 2-byte system character with many character codes called 1-byte system character, and 1 alphabetic information 6006 is made into 50 characters about a 1-byte system character with few character codes (table TAB3 reference of drawing 11 ).

[0097] Also as opposed to a 2-byte system character the non-kanji character (0x2121-0x2F7E) group of the character code of JISX0208 conformity Furthermore, 200 characters, A Chinese-characters-of-the-first-level (0x3021-0x4F7E) group 100 characters, By making a Chinese-characters-of-the-second-level (0x5021-0x7E7E) group into 50 characters, (the tables 1 and 2 of drawing 11 , four references), Generally 1 alphabetic information 6006 shall be gradually assigned like 200 characters, 100 characters, and 50 characters in order of a non-kanji character with high operating frequency, Chinese characters of the first level, and Chinese characters of the second level.

[0098] It becomes possible to utilize the management memory 2022 effectively without futility by adopting the memory composition which accompanied general text composition by this to a table.

[0099] The printing system which can apply the print control unit which starts this invention with reference to the memory map shown in drawing 12 hereafter explains the composition of the data-processing program which can be read.

[0100] Drawing 12 is drawing explaining the memory map of a storage which stores the various data-processing programs which can be read by the printing system which can apply the print control unit concerning this invention.

[0101] In addition, although it does not illustrate especially, the information for which the information which manages the program group memorized by the storage, for example, version information, a maker, etc. are memorized, and it depends on OS by the side of program read-out etc., for example, the icon which indicates the program by discernment, may be memorized.

[0102] Furthermore, the data subordinate to various programs are also managed to the above-mentioned directory. Moreover, the program for installing various programs in a computer, the program thawed when the program to install is compressed may be memorized.

[0103] The function shown in drawing 3 in this operation gestalt, drawing 6 , and drawing 7 may be carried out with the host computer by the program installed from the outside. And this invention is applied even when the information group which includes a program from an external storage is supplied by the output unit through storages, such as CD-ROM, a flash memory, and FD, or a network in that case.

[0104] As mentioned above, it cannot be overemphasized by supplying the storage which recorded the program code of the software which realizes the function of the operation gestalt mentioned above to a system or equipment, and reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage that the purpose of this invention is attained.

[0105] In this case, the program code itself read from the storage will realize the new function of this invention, and the storage which memorized the program code will constitute this invention.

[0106] As a storage for supplying a program code, a floppy disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, a magnetic tape, nonvolatile memory card, ROM, EEPROM, etc. can be used, for example.

[0107] Moreover, being contained when the function of the operation form which performed a part or all of

processing that OS (operating system) which is working on a computer is actual, based on directions of the program code, and the function of the operation form mentioned above by performing the program code which the computer read is not only realized, but was mentioned above by the processing is realized cannot be overemphasized.

[0108] Furthermore, being contained, when the function of the operation gestalt which performed a part or all of processing that CPU with which the expansion board and expansion unit are equipped is actual, and was mentioned above by the processing is realized based on directions of the program code, after the program code read from the storage is written in the memory with which the expansion unit connected to the expansion board inserted in the computer or the computer is equipped cannot be overemphasized.

[0109]

[Effect of the Invention] As explained above, according to the 1st invention concerning this invention, it is the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media. The 1st storage means which memorizes the alphabetic-data group which can be printed for every character kind, and the 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind, A creation means to create the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, It has the control means which read any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means one by one to the storage means of the above 2nd. Since the aforementioned control means carry out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0110] According to the 2nd invention, since [ the access speed to the storage means of the above 2nd ] it is more nearly high-speed than the access speed to the storage means of the above 1st, it can shorten sharply the processing time which draws final print data, and can accelerate printing processing of a page unit as a whole.

[0111] According to the 3rd invention, since the storage means of the above 1st is constituted from a non-volatile memory medium, it can read the alphabetic-data group for every character kind with sufficient repeatability.

[0112] According to the 4th invention, since it constitutes from a volatile-memory medium, the storage means of the above 2nd can accelerate the memory access taken to generate a final printing image from the alphabetic-data group for every read character kind.

[0113] According to the 5th and the 6th invention, it is the data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media. Or it is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, Since it has the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0114] Therefore, even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means is reducible, the processing time which draws final print data shortens sharply, and the effect of being able to carry out drawing processing of the printing image at high speed does so.

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[Translation done.]

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**TECHNICAL FIELD**

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[The technical field to which invention belongs] this invention relates to the storage which stored the data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and a print control unit, and the program which a computer can read.

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**PRIOR ART**

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[Description of the Prior Art] Although mass external memory, such as a magnetic disk, was used in this kind of printing system since huge alphabetic datas, such as two or more different typefaces, character sizes, etc., were stored, generally the access speed of nonvolatile MEMORIHE, such as a magnetic disk, is slow, since it is necessary to read an alphabetic data per [ non-volatile memory ] one character in the case of printing, the number of times of access of nonvolatile MEMORIHE increases, and high-speed printing is difficult, and it is \*\*\*\*\*.

[0003] Then, in order to reduce the number of times of access of nonvolatile MEMORIHE, by access of RAM etc. copying an alphabetic data with high-speed volatile MEMORIHE from non-volatile memory in group units, such as a suitable character kind, for example, a typeface, and a character size, and referring to each alphabetic data from volatile memory, the number of times of access of nonvolatile MEMORIHE was reduced, and high-speed printing was planned.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, in the 1st invention concerning this invention The 1st storage means which is the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and memorizes the alphabetic-data group which can be printed for every character kind, The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind, A creation means to create the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, It has the control means which read any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means one by one to the storage means of the above 2nd. The aforementioned control means carry out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one. Therefore, even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0110] According to the 2nd invention, since [ the access speed to the storage means of the above 2nd ] it is more nearly high-speed than the access speed to the storage means of the above 1st, it can shorten sharply the processing time which draws final print data, and can accelerate printing processing of a page unit as a whole.

[0111] According to the 3rd invention, since the storage means of the above 1st is constituted from a non-volatile memory medium, it can read the alphabetic-data group for every character kind with sufficient repeatability.

[0112] According to the 4th invention, since it constitutes from a volatile-memory medium, the storage means of the above 2nd can accelerate the memory access taken to generate a final printing image from the alphabetic-data group for every read character kind.

[0113] It is the data-processing method of the print control unit which controls printing processing of the printing section by the 5th and 6th invention based on the control command inputted from an information processor through predetermined communication media. Or it is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, It has the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one. Therefore, even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0114] Therefore, even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means is reducible, the processing time which draws final print data shortens sharply, and the effect of being able to carry out drawing processing of the printing image at high speed does so.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, there is a fault that product cost goes up since only the memory space which carries out volatile MEMORIHE storing of the alphabetic data for character kinds (a typeface, character size, etc.) is required of the above-mentioned method. furthermore, in performing printing which a limitation stores one typeface and the alphabetic data for 1 character size by the capacity of volatile memory, and uses two or more typefaces and character sizes Whenever the character kind changed, the volatile MEMORIHE alphabetic data needed to be read from non-volatile memory, the time loss occurred by the increase in this reading processing, and there was also a trouble that printing processing speed fell.

[0005] this invention is what was made in order to cancel the above-mentioned trouble. the purpose of this invention Access speed stores beforehand the alphabetic-data group for every character kind in a low speed storage. The alphabetic information managed table which manages the alphabetic data analyzed by the printing demand for every character kind is created. The alphabetic-data group for every character kind memorized with reference to this table is read into a storage with a high-speed access speed. this -- by carrying out drawing processing of the alphabetic data which serves as a final printing image with reference to the alphabetic-data group read into the high-speed storage Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down. It is offering the storage which stored the data-processing method of the print control unit which can shorten sharply the processing time which draws final print data, and can carry out drawing processing of the printing image at high speed, and a print control unit, and the program which a computer's can read.

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MEANS

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[Means for Solving the Problem] The 1st storage means which the 1st invention concerning this invention is a print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media, and memorizes the alphabetic-data group which can be printed for every character kind, The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind, A creation means to create the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, It has the control means which read any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means one by one to the storage means of the above 2nd. The aforementioned control means carry out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0007] The access speed to the storage means of the above 2nd makes 2nd invention concerning this invention more nearly high-speed than the access speed to the storage means of the above 1st.

[0008] The 3rd invention concerning this invention constitutes the storage means of the above 1st from a non-volatile memory medium.

[0009] The 4th invention concerning this invention constitutes the storage means of the above 2nd from a volatile-memory medium.

[0010] The 5th invention concerning this invention is the data-processing method of the print control unit which controls printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, It has the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0011] The 6th invention concerning this invention is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind, The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means based on each alphabetic information managed table created by the aforementioned creation process one by one, The program which a computer can read is stored in a storage for having the drawing process which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one.

[0012]

[Embodiments of the Invention] It explains referring to drawing 1 - drawing 3 about the composition of a suitable laser beam printer to apply this operation gestalt and an ink jet printer, before explaining the composition of this operation gestalt. In addition, the printer which applies this operation gestalt is not restricted to a laser beam printer and an ink jet printer, and cannot be overemphasized by that the printer of other print methods may be used.

[0013] Drawing 1 is the cross section showing the composition of the output unit which can apply this invention, and a metaphor shows the case of a laser beam printer (LBP).

[0014] In drawing, 1000 is a LBP main part, creates a character pattern, a form pattern, etc. which correspond according to those information, and forms an image in the recording paper which is a record medium while it inputs and memorizes printed information (character code etc.), form information, or microinstruction supplied from the host computer connected outside. The control panel with which, as for 1012, a switch, a Light Emitting Diode drop, etc. for a scan are arranged, and 1001 are printer control units, and analyze the alphabetic information supplied from control and the host computer of the LBP main part 1000 whole. Mainly, alphabetic information is changed into the video signal of a corresponding character pattern, and this printer control unit 1001 outputs it to the laser driver 1002.

[0015] The laser driver 1002 is a circuit for driving semiconductor laser 1003, and carries out the on-off switch of the laser beam 1004 discharged from semiconductor laser 1003 according to the inputted video signal. It is made to shake a laser beam 1004 at a longitudinal direction by the rotating polygon 1005, and it carries out scanning exposure of the electrostatic drum 1006 top. By this, the electrostatic latent image of a character pattern will be formed on the electrostatic drum 1006. After this latent image is developed by the development unit 1007 arranged at the electrostatic drum 1006 circumference, it is imprinted by the recording paper.

[0016] Using a cut sheet in this recording paper, the cut sheet recording paper is contained at the form cassette 1008 with which the LBP main part 1000 was equipped, is called feed roller 1009, with the conveyance roller 1010 and the conveyance roller 1011, is incorporated in equipment and supplied to the electrostatic drum 1006. Moreover, the LBP main part 1000 is equipped with at least one or more card slots which are not illustrated, and it is constituted so that an option font card and the control card (emulation card) from which a language system differs can be connected in addition to a built-in font.

[0017] The [1st operation gestalt] Drawing 2 is a block diagram explaining the printing structure of a system which can apply the print control unit which shows the 1st operation gestalt of this invention. Here, a laser beam printer ( drawing 1 ) is made into an example, and is explained. In addition, if the function of this invention is performed, even if it is the system by which processing is performed through networks, such as LAN, even if it is the system which consists of two or more devices even if it is the device of a simple substance, it cannot be overemphasized that this invention is applicable.

[0018] Moreover, this invention cannot be overemphasized by that it can apply when carrying out by supplying a program to a system or equipment. In this case, the storage which stored the program concerning this invention will constitute this invention. And when a system or equipment reads the program from this storage, the system or equipment operates in the procedure defined beforehand.

[0019] In drawing 2 , 2100 is a host computer, it has CPU2001 which performs the document processing system in which the figure, the image, the character, the table (a spreadsheet etc. is included), etc. were intermingled based on the document processing system program memorized by ROM for a program of ROM2003, and CPU2001 controls each device connected to a system bus 2004 in the gross. Moreover, the control program of CPU2001 etc. is memorized to ROM for a program of this ROM2003, and the font data used in the case of the above-mentioned document processing system is memorized to ROM for fonts of ROM2003.

[0020] 2002 is RAM and functions as the main memory of CPU2001, a work area, etc. 2005 is a keyboard controller (KBC) and controls the key input from a keyboard 2009 or a non-illustrated pointing device. 2006 is a CRT controller (CRTC) and controls the display of CRT display (CRT) 2010.

[0021] 2007 is a memory controller (MC) and controls access with the external memory 2011 which memorizes a boot program, various applications, font data, a user file, an edit file, etc., such as a hard disk (HD) and a floppy disk (FD).

[0022] 2008 is a printer controller (PRTC), and it connects with a printer 1000 through the predetermined bidirection interface (interface) 2021, and it performs communications control processing with a printer 1000. In addition, CPU2001 performs expansion (rasterize) processing of the outline font to the display information RAM set up for example, on RAM2002, and makes WYSIWYG on CRT2010 possible. Moreover, CPU2001 opens the various windows registered based on the command directed by the mouse cursor which is not illustrated on CRT2010, and performs various data processing.

[0023] In a printer 1000, 2012 is Printer CPU, controls access with various kinds of devices connected to a system bus 2015 based on the control program memorized by external memory 2014, such as a control program memorized by ROM for a program of ROM2013, in the gross, and outputs the picture signal as a print-out to the printing section (printer engine) 2017 connected through the printing section interface (printing interface I/F) 2016.

[0024] Moreover, to ROM for a program of this ROM2013, the control program of CPU2012 as shown with the flow chart of drawing 3 , drawing 6 , and drawing 7 etc. is memorized.

[0025] The communications processing with a host computer 2100 of CPU2012 has become possible through the input section 2018, and the host computer 2100 constitutes the information in a printer 1000 etc. possible [ a notice ].

[0026] 2019 is RAM, and it is constituted so that memory space can be extended by the option RAM which functions as the main memory of CPU2012, a work area, etc., and is connected to the extension port which is not illustrated. In addition, RAM2019 is used as the receive buffer for storing the print data (printer control code (Page Description Language)) which received from the print-out expansion field (frame buffer 2024), the environmental data storage field, and the host computer 2100, or work memory of the font data cache memory 2031 grade for storing temporarily the font data 2030 read from the below-mentioned nonvolatile external memory 2014.

[0027] Moreover, a part of RAM2019 is assigned also as management memory 2022 for dividing printed information to print, such as a character kind of a character, and a character code, per character kind, and managing it.

[0028] It is external memory for memorizing the font data 2030, such as an outline font and a bit-mapped font, access of a hard disk (HD) etc. consists of low speed non-volatile memory, and external memory 2014 has access controlled by the memory controller (MC) 2020.

[0029] Moreover, external memory 2014 may be constituted so that not only one piece but the program which interprets the printer control code from which it has at least one or more pieces, and option font data and a language system differ in addition to above-mentioned font data may be stored.

[0030] 1012 is the control panel mentioned above and a switch, a Light Emitting Diode drop, etc. for operation are

arranged. Furthermore, it has NVRAM which is not illustrated and you may make it memorize the printer mode setting information from a control panel 1012.

[0031] In addition, this operation gestalt explains the example which was adapted for the printer (printer 1000) which receives the printer control code to which the print control unit was transmitted from the host computer 2100, and performs a printout.

[0032] Hereafter, the characteristic composition of this operation gestalt is explained with reference to drawing 2 etc.

[0033] It is the print control unit (printer control unit 1001) which controls printing processing of the printing section based on the control command inputted from an information processor through the predetermined communication media (a network, interface) constituted as mentioned above. The 1st storage means which memorizes the alphabetic-data group which can be printed for every character kind (external memory 2014). The 2nd storage means which memorizes any one alphabetic-data group read from the storage means of the above 1st for every character kind (font data cache memory 2031 of RAM2019). The control command inputted from the aforementioned information processor is analyzed. A creation means (it creates, as the control program with which CPU2012 was memorized by ROM2031 and the external memory 2014 grade is performed and it is shown on the management memory 2022 at drawing 10 ) to create the alphabetic information managed table of the alphabetic data which should be printed for every character kind. The storage means of the above 2nd is received in any one alphabetic-data group memorized by the storage means of the above 1st based on each alphabetic information managed table created by the aforementioned creation means. It has the control means (CPU2012 performs, reads and processes the control program memorized by ROM2031 and the external memory 2014 grade) read one by one. the aforementioned control means Since drawing processing of the alphabetic data which can be printed is carried out for every character kind with reference to the alphabetic-data group read into the storage means of the above 2nd one by one Even when the printing demand of the alphabetic data in which a character kind is intermingled is made, the number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0034] Moreover, since [ the access speed to the storage means (RAM2019) of the above 2nd ] it is more nearly high-speed than the access speed to the storage means (external memory 2014) of the above 1st, it can shorten sharply the processing time which draws final print data, and can accelerate printing processing of a page unit as a whole.

[0035] Furthermore, since the storage means (external memory 2030) of the above 1st is constituted from a non-volatile memory medium, it can read the alphabetic-data group for every character kind with sufficient repeatability.

[0036] Moreover, since the storage means (RAM2019) of the above 2nd is constituted from a volatile-memory medium, it can accelerate the memory access taken to generate a final printing image from the alphabetic-data group for every read character kind.

[0037] Drawing 3 is a flow chart which shows an example of the 1st data-processing procedure in the print control unit concerning this invention, and corresponds to the procedure of the printer 1000 shown in drawing 2 . In addition, with this operation gestalt, if a printer control code is received from a host computer 2100, interruption starts CPU2012 and a printer control code is stored with receiving BAFFAHE on RAM2019. That is, reception is performed in parallel with processing of drawing 3 . However, since the feature is not necessarily in this processing itself, the explanation is omitted. In addition, (1) - (9) shows each step.

[0038] First, at a step (1), if a printer control code is inputted from a host computer 2100, a printer 1000 escapes from a data input waiting state, will be a step (2) and will perform printer control-code input process.

[0039] Next, although processing which analyzed the inputted printer control code and followed each command at the step (3) is performed At a step (4), when a delivery command is analyzed as this command It is a step (7) after performing character drawing processing (it mentions later for details) at a step (5). At a step (8), the content of a frame buffer 2042 is changed into a video signal, and it prints by transmitting the picture signal as a print-out to the printing section (printer engine) 2017, and by the step (9), paper is delivered to a form and it returns to a step (1).

[0040] On the other hand, when it judges with having analyzed the command of others except a delivery command, after performing drawing processing according to each command and forming a printing image on a frame buffer 204 by the step (6) at a step (4), it returns to a step (1).

[0041] Here, the composition of the alphabetic information managed table 6000 stored on the management memory 2022 of the printer 1000 interior shown in drawing 2 is explained using drawing 4 .

[0042] Drawing 4 is drawing explaining the composition of the alphabetic information managed table built on the management memory 2022 shown in drawing 2 .

[0043] In drawing, 6000 is an alphabetic information managed table, when the printer control code inputted at the step (6) shown in drawing 3 is a printing command, it is for managing the alphabetic information suggested by this command, and the flowchart of below-mentioned drawing 6 is accompanied, and it is controlled.

[0044] The alphabetic information managed table 6000 consists of character kind information 6001 and 1 alphabetic information 6006. Furthermore, the character kind information 6001 consists of two or more following parameters, in order to distinguish a character kind.

[0045] 6002 is a kind and the information for distinguishing the kind of fonts, such as an outline font and a bit-mapped font, is set up. 6003 is a typeface name, for example, the information for distinguishing typeface names, such as a Mincho typeface, a block letter, Dutch, and a courier, is set up. 6004 is a character size, for example, the

information for distinguishing character sizes, such as eight points, ten points, and 12 etc. points, is set up. 6005 is a group and the information for carrying out division management according to the kind of character is set up.

[0046] As an example of a group 6005, the character code of JISX0208 conformity A non-kanji character (0x2121-0x2F7E), What [ was divided into Chinese characters of the first level (0x3021-0x4F7E) and three Chinese characters of the second level (0x5021-0x7E7E) ] Or what divided the character code of JISX0201 conformity into two, a Roman alphabet (0x00-0x7F) and katakana (0x80-0xFF), is shown.

[0047] Moreover, what divided the whole sentence character code of JISX0208 conformity by arbitrary numbers about the group division besides the above setup shall be used. In addition, if it is the information for distinguishing a character kind, the information except having stated in the top shall also be used.

[0048] Furthermore, 1 alphabetic information 6006 serves as a parameter in every character belonging to the character kind information 6001. It consists of the coordinate information 6007 and character codes 6008 which defined XY coordinate as the printing position of a character. In addition, the alphabetic information managed table 6000 shall set up arbitrary numbers of 1 alphabetic information to one.

[0049] Moreover, although the alphabetic information managed table 6000 is attached to an one-character kind and it is one, it makes it possible to own two or more alphabetic information managed tables by within the limits which a memory size allows on the management memory 2022.

[0050] Thus, by having the alphabetic information managed table 6000 two or more places, it becomes possible to distribute each alphabetic information by which printing specification was distributed and carried out into the printer control code on the alphabetic information managed table 6000 with the respectively same character attribute.

[0051] In addition, alphabetic information shall consist of the printing coordinates and character codes for constituting the character kind for defining the character kind information 6001, and 1 alphabetic information 6006. Moreover, alphabetic information explains the generation processing with reference to below-mentioned drawing 6 and drawing 7 , although the alphabetic information managed table (it is only called a table below) 6000 is generated when inputted by the host 2100 as a printer control code.

[0052] Drawing 5 is drawing explaining the example which manages two or more alphabetic information managed tables 6000 shown in drawing 4 .

[0053] 4 bytes is assigned to 20 bytes and a character size 6004, 12 bytes and a total of 40 bytes are assigned to the kind 6002 of character kind information 6001 in a group 6005 at 4 bytes and the typeface name 6003 as shown to drawing 5 by this example, 8 bytes is assigned to the coordinate information 6007 on 1 alphabetic information 6006, 2 bytes and a total of 10 bytes are assigned to a character code 6008, and the storing field of 1 alphabetic information is owned by 100 characters.

[0054] Moreover, in this example, 1040 bytes per one table of management memory 2022 is consumed. Furthermore, by carrying out three-set (table [ TAB / TAB - / 3 ] 1) preparation of the above-mentioned table, a character kind which is different by 100 characters in 1 alphabetic information 6006 of the same character kind can be managed by three sets, and 1040 byte x three-set = 3120 bytes of management memory 2022 is consumed.

[0055] In addition, although the table of 100 characters per one-character kind was made into three sets in this example, it makes it possible to set up the number freely within limits which the memory size of the management memory 2022 allows.

[0056] Drawing 6 is a flow chart which shows an example of the 2nd data-processing procedure in the print control unit concerning this invention, and corresponds to the table supervisory control procedure in the drawing processing shown in the step (6) shown in drawing 3 . In addition, (1) - (12) shows each step.

[0057] First, with this operation gestalt, although other drawing processings meeting each command are performed and printing processing is performed by the step (12) at a step (1) when it judges whether the printer control code inputted from the host computer 2100 is alphabetic information and it is judged that it is except printed information, since the feature is not necessarily in this processing, concrete explanation shall be omitted.

[0058] On the other hand, at a step (2), when it is judged that it is printed information, in order to register alphabetic information on a table, the table in the management memory 2022 is searched with a step (1). And when it is judged based on this reference result that it judges whether the table which is equivalent to the character kind of the above-mentioned alphabetic information at a step (3) exists, and a table does not exist, since it is necessary to generate a table newly, an intact table is searched with a step (4).

[0059] And at a step (5), when it is judged that it judges and an intact table exists whether an intact table exists, by the step (6), the character kind information 6001 is generated from the character kind in alphabetic information, and one 1 alphabetic information 6006 is further stored from a printing coordinate and a character code.

[0060] In addition, all tables shall be initialized at the time of the input start of a printer control code.

[0061] On the other hand, at a step (5), by the step (8), a used table is released to \*\* judged that the intact table 6000 does not exist, and an intact table is secured to it. Here, release of a used table performs printing processing based on all 1 alphabetic information 6006 stored in the table, and means emptying 1 alphabetic information. Moreover, 1 alphabetic information in a table is the thing of a printing schedule, and actual printing processing ends it by drawing on a frame buffer 2024 based on sympathy news (this processing is henceforth called release processing).

[0062] In a step (8), the table which releases is specifically searched, and the table released from a reference result is chosen. Although two or more tables exist and one table is chosen from this inside, the following methods are taken as criteria for selection of a table. First, one table which searches all tables and stores most 1 alphabetic information 6006 is chosen.

[0063] Here, when two or more tables with the equivalent number of storing of 1 alphabetic information exist, one arbitrary table is chosen. By choosing a table based on these criteria for selection, since all the storing fields of 1 alphabetic information 6006 were consumed, the state (this state is henceforth called table overflow) of stopping being able to carry out additional storing of the 1 alphabetic information becomes possible [ releasing preferentially the table which is easiest to generate ].

[0064] Next, after the table released at a step (7) is chosen at a step (8), the font data 2030 equivalent to the character kind of this table is read into up to the font data cache 2031 from external memory 2014 at a step (9).

[0065] Here, font data 2030 shall read all the data of the corresponding character kind regardless of 1 alphabetic information stored in the table. However, the font data cache 2031 is premised on securing only the field which can read the required font data 2030 altogether.

[0066] Then, at a step (10), based on all 1 alphabetic information stored in the table, it draws on a frame buffer 2024, and printing processing is performed at a step (11) and it returns to a step (10) until it is judged with all printings having been completed.

[0067] On the other hand, at a step (10), when judged with a printing end, by the step (6), new alphabetic information is stored into the released table, and processing is ended.

[0068] It becomes possible to prevent the time loss by too much access of nonvolatile MEMORIHE by printing the font data 2030, such as a bit-mapped font and an outline font, here using the font data 2030 stored in the font data cache 2031 in the printing processing in a step (10).

[0069] In addition, with this operation gestalt, since the feature is not necessarily in the printing processing itself which uses font data 2030, the explanation is omitted.

[0070] When it judges whether a table overflow occurs at a step (7) when it is judged that the table which is equivalent to the character kind of alphabetic information at a step (3) on the other hand exists, and a table overflow does not occur, it progresses to a step (6), printed information is stored, and processing is ended.

[0071] On the other hand, by the step (7), when it judges with a table overflow occurring, after performing release processing of this table by step (9) - (11), at a step (6), printed information is stored to this table and processing is ended.

[0072] Next, with reference to the flow chart shown in drawing 7, the alphabetic printing procedure in the step (5) shown in drawing 3 is explained in full detail.

[0073] Drawing 7 forms the whole sentence character of a printing schedule as a printing image on a frame buffer 2024 by this BEJI by corresponding to the procedure for releasing all the tables in which showing an example of the 3rd data-processing procedure in the print control unit concerning this invention and that are flow charts and were generated on this page before delivery, and releasing the whole sentence character in a table according to this processing. In addition, (1) - (5) shows each step.

[0074] First, processing is ended, when all tables are searched with a step (1), it judges whether there is any non-released table at a step (2) and all tables are judged to be release ending.

[0075] On the other hand, when it judges with a non-released table existing at a step (2), it is a step (3) and the font data 2030 equivalent to the character kind of this table is read into up to the font data cache 2031 from external memory 2014.

[0076] Here, font data 2030 shall read all the alphabetic datas of the corresponding character kind regardless of 1 alphabetic information stored in the table. However, the font data cache 2031 is premised on securing only the field which can read the required font data 2030 altogether.

[0077] Then, at a step (4), based on all 1 alphabetic information stored in the table, it draws on a frame buffer 2024, and printing processing is performed at a step (5) and it returns to a step (4) until it judges that the end, i.e., printing processing, was completed by all drawing processings.

[0078] On the other hand, at a step (4), when judged with a printing end, it returns to a step (1).

[0079] Here, the concrete example of the table created according to the flow chart shown in drawing 6 is explained using drawing 8 - drawing 10.

[0080] Drawing 8 is drawing showing the example of alphabetic printing processing printed in the printing section 2017 shown in drawing 2, and is the case where the "character code table JISI water" as alphabetic information which corresponded to the printing image over the recording paper, and was inputted above the recording paper is printed.

[0081] In drawing 8, a longitudinal direction and lengthwise arrow is an axis of coordinates for defining the printing position of the above-mentioned character string, to the recording paper, the X-axis is set as the longitudinal direction and the Y-axis is set as lengthwise.

[0082] In addition, the case where the coordinate unit of the same axle is defined as 1/100 inch by this example is explained.

[0083] Drawing 9 is drawing explaining the detailed composition of the character string in the example of alphabetic printing processing shown in drawing 8, the enlarged display of the "character code table JISI water" is carried out, it is stylish, the width-of-face quantity in every character is surrounded, and the lower left edge of each frame shows the printing reference point of each character.

[0084] In drawing 9, in this character string, "1 water" shall use ten points of Mincho typefaces of an outline font with the "character code table", and "JIS" shall use ten points of the courier typeface of an outline font.

[0085] Drawing 10 is drawing showing the example of a table created to the character string shown in drawing 8. The character kind of a table TAB 1 The Chinese characters of the first level of JISX0208 conformity of ten points



of Mincho typefaces of an outline font, The character kind of a table TAB 2 The first level non-kanji character of JISX0208 conformity of ten points of Mincho typefaces of an outline font, The character kind of a table TAB 3 is assigning the Roman alphabet of the JISX0201 conformity of ten points of the courier typeface of an outline font, and has secured 1 alphabetic information by 100 characters to each table.

[0086] In addition, "KO", "-", "DO", and "1" are assigned to a table TAB 2, and "J", "I", and "S" are assigned to the table TAB 1 for the "sentence" among the character strings of drawing 8, a "character", a "table", and "water" at the table TAB 3.

[0087] moreover — drawing 10 — being shown — one — alphabetic information — 6006 — inside — a coordinate — information — 6007 — \*\*\*\* — printing — a coordinate — a unit — one — / — 100 — an inch — \*\* — having carried out — a case — printing — a coordinate — " (an X coordinate, Y coordinate) — " — expressing — \*\*\*\* .

[0088] By performing printing processing based on three tables TAB1-TAB3 shown in drawing 10 as mentioned above, it becomes possible to control the number of times of access to external memory 2014 to 3 times.

[0089] In addition, although it is possible to carry out a group division, and for it to become unnecessary to read into a non-kanji character and the kanji individually, and to reduce further the number of times of access to external memory 2014 as shown in drawing 10 when the capacity which can read the font data 2030 for one typeface on the font data cache memory 2031 shown in drawing 2 is securable, since it is necessary to prepare the huge memory which reads the font data for one typeface, there is a fault that memory efficiency becomes bad.

[0090] On the other hand, if font data 2030 is read for every character, the advantage that the font data cache memory 2031 is little, and ends has the fault that the number of times of access of external memory 2014 HE of a certain thing increases.

[0091] Though the font data cache memory 2031 restricted in memory space by controlling printing processing according to this operation gestalt is used, the number of times of reading of the font data 2030 from external memory 2014 can be cut down, and high-speed printing processing is attained.

[0092] Hereafter, the characteristic composition of this operation gestalt is explained with reference to drawing 6, drawing 7, etc.

[0093] It is the data-processing method of the print control unit (printer control unit 1001) which controls printing processing of the printing section based on the control command inputted from an information processor (host computer 2100) through the predetermined communication media constituted as mentioned above. Or it is the storage which stored the program which the computer which controls the printer which performs printing processing of the printing section based on the control command inputted from an information processor through predetermined communication media can read. The creation process which creates the alphabetic information managed table of the alphabetic data which should analyze and print the control command inputted from the aforementioned information processor for every character kind (step [ of drawing 6 ] (1) - (9)). The reading process which reads into the 2nd storage means each alphabetic-data group memorized by the 1st storage means (external memory 2030) based on each alphabetic information managed table created by the aforementioned creation process one by one (step [ of drawing 7 ] (1) - (3)), the drawing process (the step (4) of drawing 7 —) which carries out drawing processing of the alphabetic data which can be printed for every character kind with reference to the alphabetic-data group read into the storage means (font data cache memory 2031 on RAM2019) of the above 2nd one by one Since it had (5), even when the printing demand of the alphabetic data in which a character kind is intermingled is made The number of times which reads into the 2nd storage means the alphabetic-data group memorized for every character kind to the 1st storage means can be cut down, and the processing time which draws final print data can be shortened sharply.

[0094] The [2nd operation gestalt] Although the aforementioned 1st operation gestalt explained the case where the number of storing of 1 alphabetic information 6006 in each table was made into the same number, you may constitute from a 2nd operation gestalt by changing the number of storing of 1 alphabetic information for every table so that the management memory 2022 can be utilized effectively. Hereafter, the operation gestalt is explained.

[0095] Drawing 11 is drawing showing the example of an one-character table for every character kind in the print control unit which shows the 2nd operation gestalt of this invention, and when the number of storing of 1 alphabetic information is changed every tables TAB [ TAB1-] 4 and it is created on RAM2019, it corresponds.

[0096] Although 1 alphabetic information 6006 was secured by 100 characters on each tables TAB1-TAB3 shown in drawing 10 As opposed to needing 2 bytes for expressing the character code of the character kind of JISX0208 conformity (henceforth) it is called a 2-byte system character — since only 1 byte is needed for on the other hand expressing the character code of the character kind of JISX0201 conformity (henceforth) 1 alphabetic information 6006 is made into 100 characters about the 2-byte system character with many character codes called 1-byte system character, and 1 alphabetic information 6006 is made into 50 characters about a 1-byte system character with few character codes (table TAB3 reference of drawing 11 ).

[0097] Also as opposed to a 2-byte system character the non-kanji character (0x2121-0x2F7E) group of the character code of JISX0208 conformity Furthermore, 200 characters, A Chinese-characters-of-the-first-level (0x3021-0x4F7E) group 100 characters, By making a Chinese-characters-of-the-second-level (0x5021-0x7E7E) group into 50 characters, (the tables 1 and 2 of drawing 11, four references), Generally 1 alphabetic information 6006 shall be gradually assigned like 200 characters, 100 characters, and 50 characters in order of a non-kanji character with high operating frequency, Chinese characters of the first level, and Chinese characters of the second level.

[0098] It becomes possible to utilize the management memory 2022 effectively without futility by adopting the

memory composition which accompanied general text composition by this to a table.

[0099] The printing system which can apply the print control unit which starts this invention with reference to the memory map shown in drawing 12 hereafter explains the composition of the data-processing program which can be read.

[0100] Drawing 12 is drawing explaining the memory map of a storage which stores the various data-processing programs which can be read by the printing system which can apply the print control unit concerning this invention.

[0101] In addition, although it does not illustrate especially, the information for which the information which manages the program group memorized by the storage, for example, version information, a maker, etc. are memorized, and it depends on OS by the side of program read-out etc., for example, the icon which indicates the program by discernment, may be memorized.

[0102] Furthermore, the data subordinate to various programs are also managed to the above-mentioned directory. Moreover, the program for installing various programs in a computer, the program thawed when the program to install is compressed may be memorized.

[0103] The function shown in drawing 3 in this operation gestalt, drawing 6 , and drawing 7 may be carried out with the host computer by the program installed from the outside. And this invention is applied even when the information group which includes a program from an external storage is supplied by the output unit through storages, such as CD-ROM, a flash memory, and FD, or a network in that case.

[0104] As mentioned above, it cannot be overemphasized by supplying the storage which recorded the program code of the software which realizes the function of the operation gestalt mentioned above to a system or equipment, and reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage that the purpose of this invention is attained.

[0105] In this case, the program code itself read from the storage will realize the new function of this invention, and the storage which memorized the program code will constitute this invention.

[0106] As a storage for supplying a program code, a floppy disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, a magnetic tape, nonvolatile memory card, ROM, EEPROM, etc. can be used, for example.

[0107] Moreover, being contained when the function of the operation gestalt which performed a part or all of processing that OS (operating system) which is working on a computer is actual, based on directions of the program code, and the function of the operation gestalt mentioned above by performing the program code which the computer read is not only realized, but was mentioned above by the processing is realized cannot be overemphasized.

[0108] Furthermore, being contained, when the function of the operation gestalt which performed a part or all of processing that CPU with which the expansion board and expansion unit are equipped is actual, and was mentioned above by the processing is realized based on directions of the program code, after the program code read from the storage is written in the memory with which the expansion unit connected to the expansion board inserted in the computer or the computer is equipped cannot be overemphasized.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the cross section showing the composition of the output unit which can apply this invention.

[Drawing 2] It is a block diagram explaining the printing structure of a system which can apply the print control unit which shows the 1st operation gestalt of this invention.

[Drawing 3] It is the flow chart which shows an example of the 1st data-processing procedure in the print control unit concerning this invention.

[Drawing 4] It is drawing explaining the composition of the alphabetic information managed table built on the management memory shown in drawing 2 .

[Drawing 5] It is drawing explaining the example which manages two or more alphabetic information managed tables shown in drawing 4 .

[Drawing 6] It is the flow chart which shows an example of the 2nd data-processing procedure in the print control unit concerning this invention.

[Drawing 7] It is the flow chart which shows an example of the 3rd data-processing procedure in the print control unit concerning this invention.

[Drawing 8] It is drawing showing the example of alphabetic printing processing printed in the printing section shown in drawing 1 .

[Drawing 9] It is drawing explaining the detailed composition of the character string in the example of alphabetic printing processing shown in drawing 8 .

[Drawing 10] It is drawing showing the example of a table created to the character string shown in drawing 8 .

[Drawing 11] It is drawing showing the example of an one-character table for every character kind in the print control unit which shows the 2nd operation gestalt of this invention.

[Drawing 12] It is drawing explaining the memory map of a storage which stores the various data-processing programs which can be read by the printing system which can apply the print control unit concerning this invention.

**[Description of Notations]**

(Host computer)

2001 CPU

2002 RAM

2003 Font ROM, Program ROM

2004 System Bus

2005 KBC

2006 CRTC

2007 MC

2008 PRTC

2009 KB

2010 CRT

2011 External Memory

2021 Bidirectional I/F Cable

2100 Host Computer

(Printer)

2012 CPU

2013 Program ROM

2014 External Memory

2015 System Bus

2016 Printing Section I/F

2017 Printing Section

2018 Input Section

2019 RAM

2020 MC

2022 Management Memory

1000 Printer

1001 Printer Control Unit

1012 Control Panel

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[Translation done.]

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